NCC Test Report

Equipment	:	Wall plate 802.11ac Wave 2, 2x2:2, BT, Internal Antenna
Brand Name	:	Extreme Networks
Model No.	:	AP-7612
Standard	:	LP0002 Section 3.10.1 (2016-08-23)
Frequency	:	2400 MHz – 2483.5 MHz
Function	:	☒Point-to-multipoint; ☐Point-to-point
Applicant	:	香港商極進網路有限公司台灣分公司 臺北市松山區復勢里南京東路 4 段 126 號 5 樓
Manufacturer	:	啟碁科技股份有限公司 新竹科學工業園區新竹縣園區二路 20 號

The product sample received on Apr. 13, 2017 and completely tested on Jun. 15, 2017. We, SPORTON, 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 INTERNATIONALINC., the test report shall not be reproduced except in full.

Cliff Chang
SPORTON INTERNATIONAL INC.

Testing Laboratory
1190

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PHOTOGRAPHS OF EUT V01

Summary of Test Result

Conformance Test Specifications				
Report Clause	**Ref. Std. Clause**	**Description**	**Limit**	**Result**
1.1.2	3.10.1.4	Antenna Requirement	LP0002-2.2	Complied
3.1	2.3	AC Power-line Conducted Emissions	LP0002-2.3	Complied
3.2	3.10.1.6	DTS Bandwidth	≥500kHz	Complied
3.3	3.10.1.2	Maximum Conducted Output Power	Power [dBm]:30	Complied
3.4	3.10.1.6	Power Spectral Density	PSD [dBm/3kHz]:8	Complied
3.5	3.10.1.5	Emissions in Non-restricted Frequency Bands	Non-Restricted Bands: >30 dBc	Complied
3.6	3.10.1.5	Emissions in Restricted Frequency Bands	Restricted Bands: LP0002-2.8	Complied

Revision History

Report No.	Version	Description	Issued Date
TR741335-02AE	Rev. 01	Initial issue of report	Oct. 02, 2017

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	1TX

Note:
- Bluetooth LE uses a GFSK (1Mbps) modulation for DSSS.
- BWch is the channel separation
- Nss-Min is the minimum number of spatial streams.
- Nant is the number of outputs. e.g., 2(2, 3) means have 2 outputs for port 2 and port 3. 2 means have 2 outputs for port 1 and port 2.

1.1.2 Antenna Information

Ant.	Brand	P/N	Antenna Type	Connector	Gain (dBi)		
					2.4G	5G	BT
1	WNC	95XKAA15.GBO	Dipole Antenna	I-PEX	5.4	-	-
2	WNC	95XKAA15.GBP	Dipole Antenna	I-PEX	5.4	-	-
3	WNC	95XKAA15.GBR	Dipole Antenna	I-PEX	-	8.5	-
4	WNC	95XKAA15.GBQ	Dipole Antenna	I-PEX	-	8.5	-
5	WNC	95XKAA15.GBS	Dipole Antenna	I-PEX	-	-	3.7

Note: The EUT has five antennas.

<For 2.4GHz Function>

For IEEE 802.11b/g/n/ac mode (1TX, 2RX):

Ant. 1 connect to port 2 and Ant. 2 connect to port 1

The EUT supports the Ant. 1 and Ant. 2 with TX diversity function.

Ant. 2 generated the worst case than Ant. 1, so it is tested and recorded in the report.

Ant. 1 and Ant. 2 could receive simultaneously.

For IEEE 802.11b/g/n/ac mode (2TX, 2RX):

Ant. 1 connect to port 1 and Ant. 2 connect to port 2

Ant. 1 and Ant. 2 could transmit/receive simultaneously.

<For 5GHz Function>

For IEEE 802.11a/n/ac mode (1TX, 2RX):

Ant. 3 connect to port 2 and Ant. 4 connect to port 1

The EUT supports the Ant. 3 and Ant. 4 with TX diversity function.

Ant. 4 generated the worst case than Ant. 3, so it is tested and recorded in the report.

Ant. 3 and Ant. 4 could receive simultaneously.

For IEEE 802.11a/n/ac mode (2TX, 2RX):

Ant. 3 connect to port 1 and Ant. 4 connect to port 2

Ant. 3 and Ant. 4 could transmit/receive simultaneously.

<For Bluetooth Function>

For bluetooth mode (1TX, 1RX):

Ant. 5 connect to port 1

Only Ant. 5 can be used as transmitting/receiving antenna.

1.1.3 Mode Test Duty Cycle

Mode	DC	DCF(dB)
BT-LE(1Mbps)	0.626	2.034

1.1.4 EUT Operational Condition

EUT Power Type	From Power Adapter or PoE

1.2 Testing Applied Standards

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

- NCC LP0002 (2016-08-23)
- ANSI C63.10-2013
- FCC KDB 558074 D01 v04

1.3 Testing Location Information

Testing Location							
☐	HWA YA	ADD	:	No. 52, Hwa Ya 1st Rd., Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.			
		TEL	:	886-3-327-3456	FAX	:	886-3-318-0055
☒	JHUBEI	ADD	:	No.8, Lane 724, Bo-ai St., Jhubei City, HsinChu County 302, Taiwan, R.O.C.			
		TEL	:	886-3-656-9065	FAX	:	886-3-656-9085

Test Condition	Test Site No.	Test Engineer	Test Environment	Test Date
RF Conducted	TH01-CB	Brian Sun	22°C / 54%	Apr. 27, 2017 ~ May 13, 2017
Radiated below 1GHz (Intentional)	03CH01-CB	Welson Chen & Paul Chen & Justin Lin	22°C / 54%	Jun. 13, 2017~Jun. 14, 2017
Radiated below 1GHz (Unintentional)	03CH01-CB	Welson Chen & Paul Chen & Justin Lin	22°C / 54%	May 06, 2017
Radiated above 1GHz (Unintentional 1GHz~5th)	03CH01-CB	Welson Chen & Paul Chen & Justin Lin	22°C / 54%	May 06, 2017
Radiated above 1GHz (Intentional 1GHz~10th)	03CH01-CB	Welson Chen & Paul Chen & Justin Lin	22°C / 54%	Apr. 21, 2017 ~ May 31, 2017
AC Conduction (Intentional)	CO01-CB	Rick Yeh	25°C / 60%	Jun. 15, 2017
AC Conduction (Unintentional)	CO01-CB	Kane Liu	22°C / 58%	May 08, 2017

Test site Designation No. TW0006 with FCC.
Test site registered number IC 4086D with Industry Canada.

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)	3.2 dB	Confidence levels of 95%
Radiated Emission (30MHz ~ 1,000MHz)	3.6 dB	Confidence levels of 95%
Radiated Emission (1GHz ~ 18GHz)	3.7 dB	Confidence levels of 95%
Radiated Emission (18GHz ~ 40GHz)	3.5 dB	Confidence levels of 95%
Conducted Emission	1.7 dB	Confidence levels of 95%
Output Power Measurement	1.33 dB	Confidence levels of 95%
Power Density Measurement	1.27 dB	Confidence levels of 95%
Bandwidth Measurement	9.74×10^{-8}	Confidence levels of 95%

2 Test Configuration of EUT

2.1 Test Channel Mode

Mode	Power Setting
BT-LE(1Mbps)	-
2402MHz	Default
2442MHz	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
Operating Mode	Intentional - CTX
1	EUT + WLAN 2.4GHz + Adapter
2	EUT + WLAN 2.4GHz + PoE
3	EUT + WLAN 5GHz + Adapter
4	EUT + WLAN 5GHz + PoE
5	EUT + BT2.0 + Adapter
6	EUT + BT2.0 + PoE
7	EUT + BT4.0 + Adapter
8	EUT + BT4.0 + PoE
For operating mode 8 is the worst case and it was record in this test report.	
Operating Mode	Unintentional - Normal Link
1	EUT + Adapter
2	EUT + PoE
For operating mode 2 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

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	Intentional - CTX
1	EUT in Y axis + WLAN 2.4GHz + Adapter
2	EUT in Y axis + WLAN 2.4GHz + PoE
3	EUT in Y axis + WLAN 5GHz + Adapter
4	EUT in Y axis + WLAN 5GHz + PoE
5	EUT in Y axis + BT2.0 + Adapter
6	EUT in Y axis + BT2.0 + PoE
7	EUT in Y axis + BT4.0 + Adapter
8	EUT in Y axis + BT4.0 + PoE
For operating mode 2 is the worst case and it was record in this test report.	
Operating Mode < 1GHz	Unintentional - Normal Link
1	EUT in Y axis + Adapter
2	EUT in Y axis + PoE
For operating mode 1 is the worst case and it was record in this test report.	
Operating Mode > 1GHz Unintentional 1GHz~5th	Unintentional - Normal Link
Mode 1 generated the worst test result for Radiated emission unintentional below 1GHz test, thus the measurement fot Radiated emission unintentional 1GHz~5th Harmonic test will follow this same test configuration.	
1	EUT in Y axis + Adapter
Operating Mode > 1GHz Intentional 1GHz~10th	Intentional - CTX
1	EUT in Y axis

Note1: The EUT can only use Y axis position.

Note2: The PoE was for measurement only, would not be marketed.

The PoE information as below:

Support Unit	Brand	Model Number
PoE	Microsemi	PD-6238G300

2.3 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

2.4 Accessories

Accessories			
Equipment Name	**Brand Holder**	**Model Name**	**Rating**
Adapter (Interchangeable plug)	Powertron Electronics Corp.	PA1024-120IB200	INPUT: 100-240V ~ 50-60Hz, 0.6A OUTPUT: 12V, 2.0A, 24W Max
Other			
EU plug*1 / BZ plug*1 / AU plug*1			
China plug*1 / US plug*1 / UK plug*1			
Wall-mounted rack*1			

Note: Adapter could change six different plugs (EU, BZ, AU, China, US and UK), only adapter with US plug was selected to test and recorded in this report as a result.

2.5 Support Equipment

For Test Site No: CO01-CB
Operating Mode: Intentional - CTX

Support Equipment				
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**
1	NB	DELL	E6430	DoC
2	PoE	Microsemi	PD-6238G300	DoC

Operating Mode: Unintentional - Normal Link

Support Equipment				
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**
1	NB*4	DELL	E6430	DoC
2	CBT Bluetooth tester	Anritsu	MT8852B	DoC
3	PoE	Microsemi	PD-6238G300	DoC

For Test Site No: 03CH01-CB (below 1GHz)
Operating Mode: Intentional - CTX

Support Equipment				
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**
1	NB	DELL	E4300	DoC
2	PoE	Microsemi	PD-6238G300	DoC

Operating Mode: Unintentional - Normal Link

Support Equipment				
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**
1	NB*2	DELL	E4300	DoC
2	NB*2	Apple	Mac Book	DoC
3	CBT Bluetooth tester	Anritsu	MT8852B	DoC

For Test Site No: 03CH01-CB (above 1GHz) / Operating Mode: Unintentional 1~5th

Support Equipment				
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**
1	NB*2	DELL	E4300	DoC
2	NB*2	Apple	Mac Book	DoC
2	CBT Bluetooth tester	Anritsu	MT8852B	DoC

Operating Mode: Intentional 1~10th
For non-beamforming mode

Support Equipment				
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**
1	NB	DELL	E4300	DoC

For beamforming mode

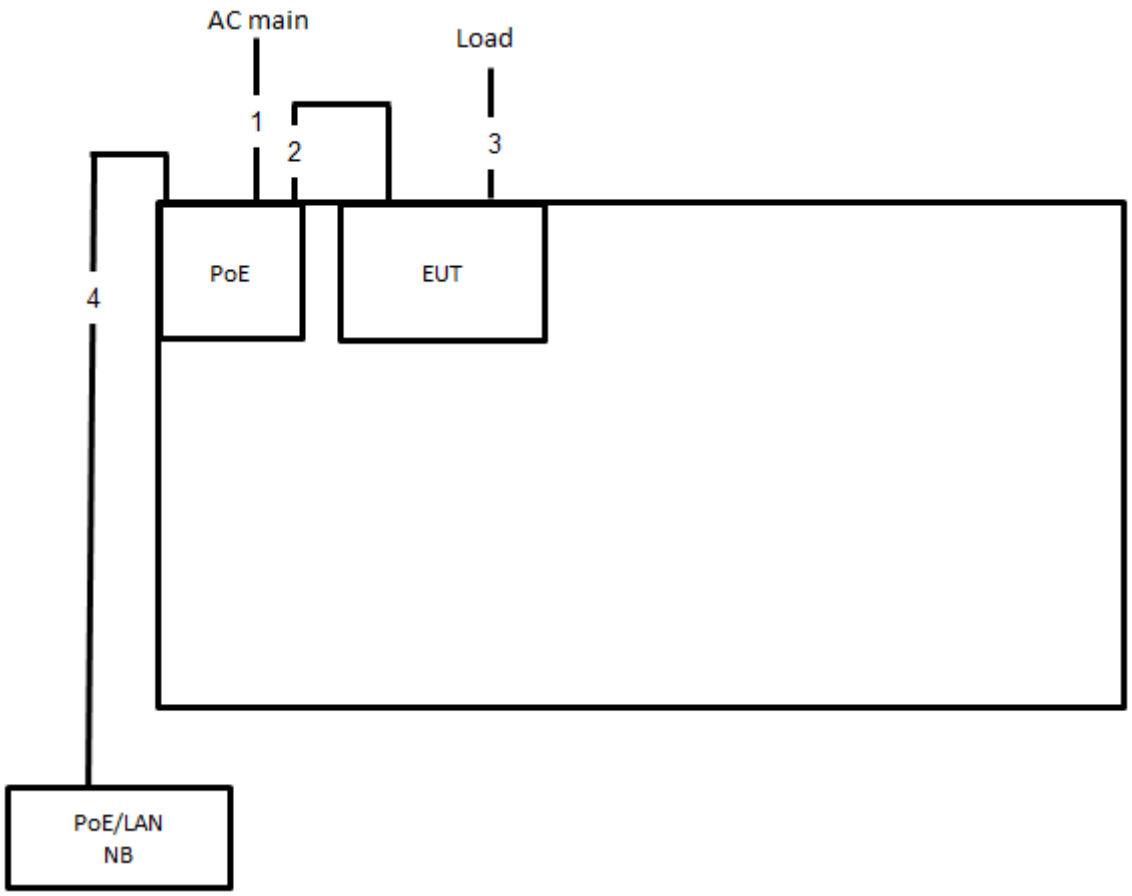
Support Equipment				
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**
1	NB*2	DELL	E4300	DoC
2	RX Device	Extreme Networks	AP-7612	QXO-AP7612

For Test Site No: TH01-CB

Support Equipment				
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**
1	NB	DELL	E4300	DoC

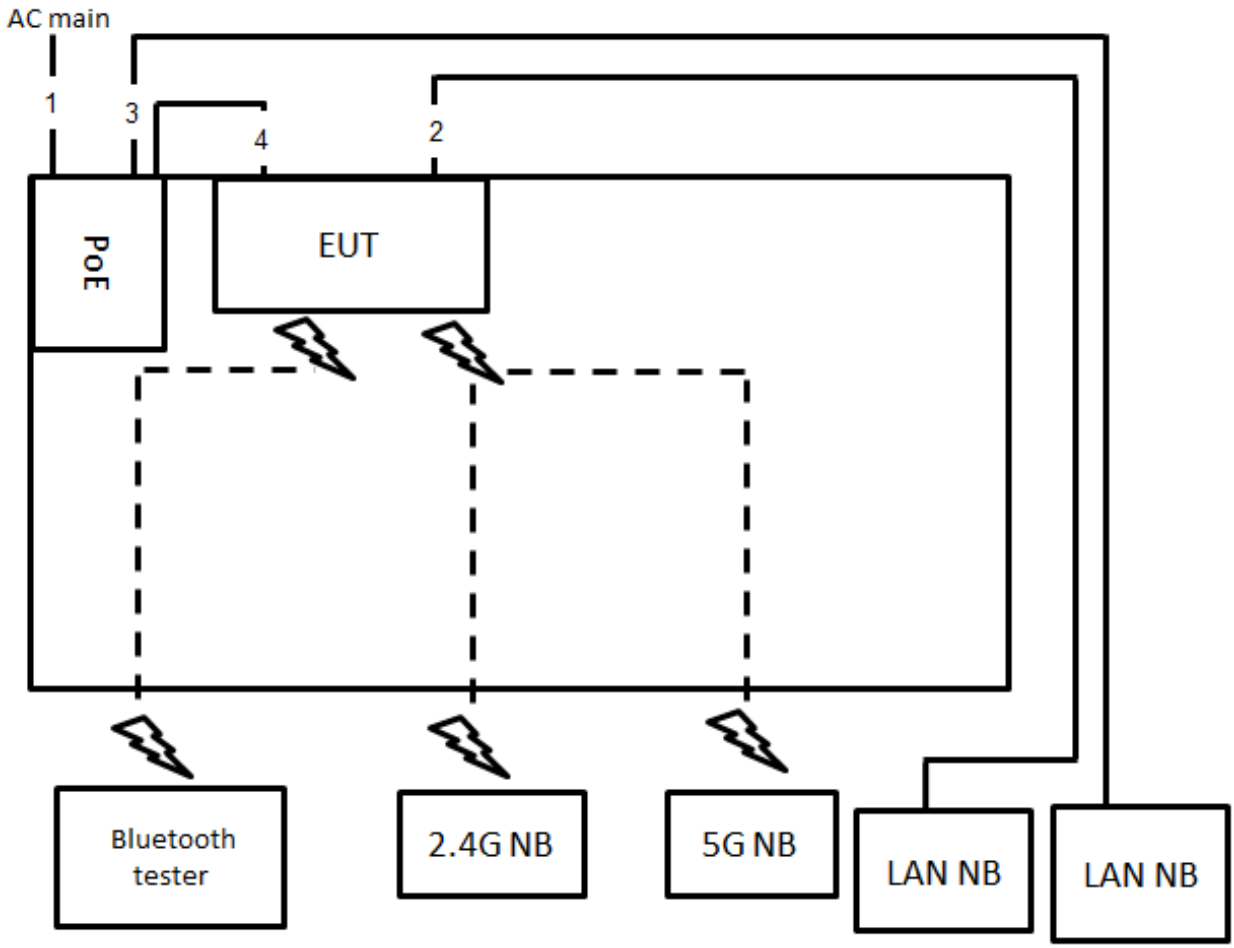
2.6 Test Setup Diagram

Test Setup Diagram – AC Line Conducted Emission Test
Operating Mode: Intentional - CTX



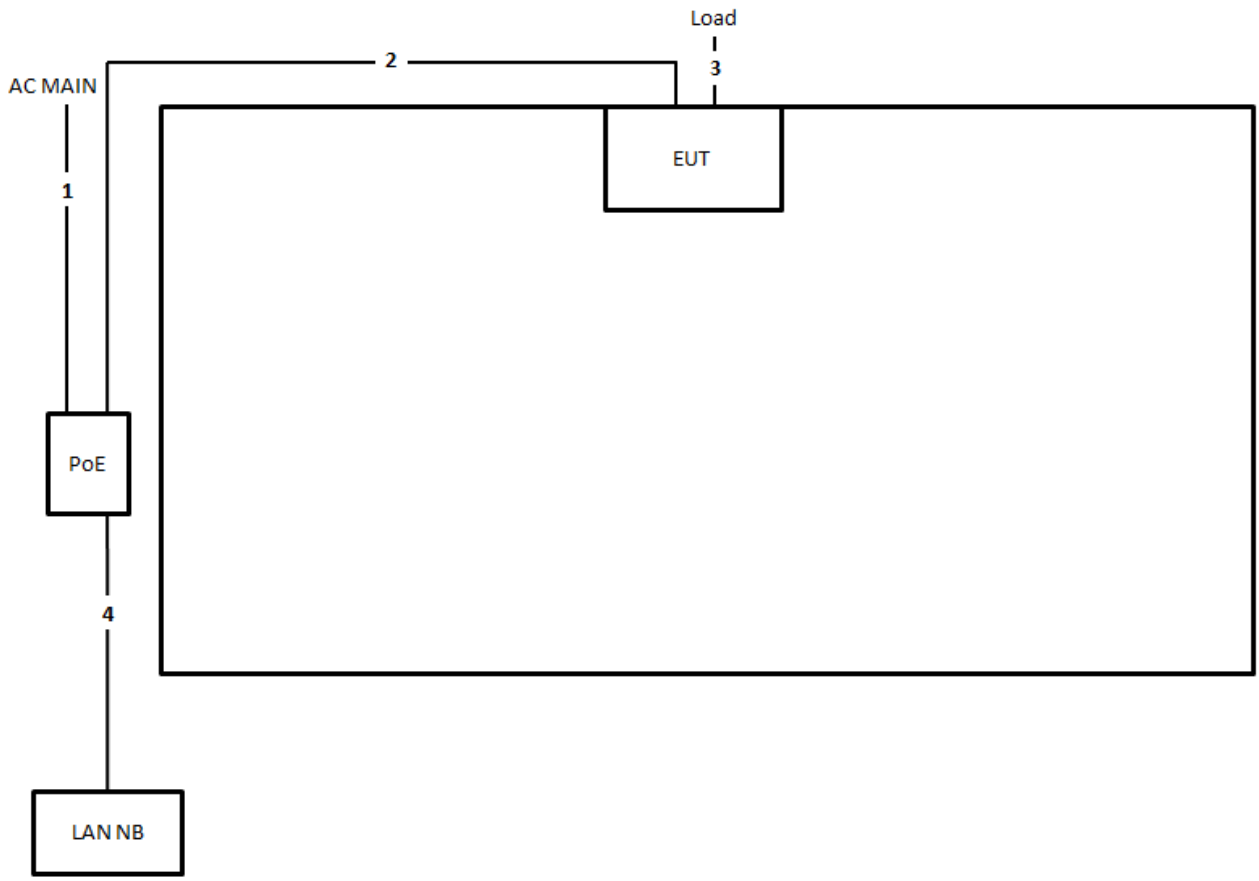
Item	Connection	Shielded	Length
1	Power cable	No	1.5m
2	RJ-45 cable	No	1.5m
3	RJ-45 cable	No	1.5m
4	RJ-45 cable	No	10m

Test Setup Diagram – AC Line Conducted Emission Test
Operating Mode: Unintentional - Normal Link



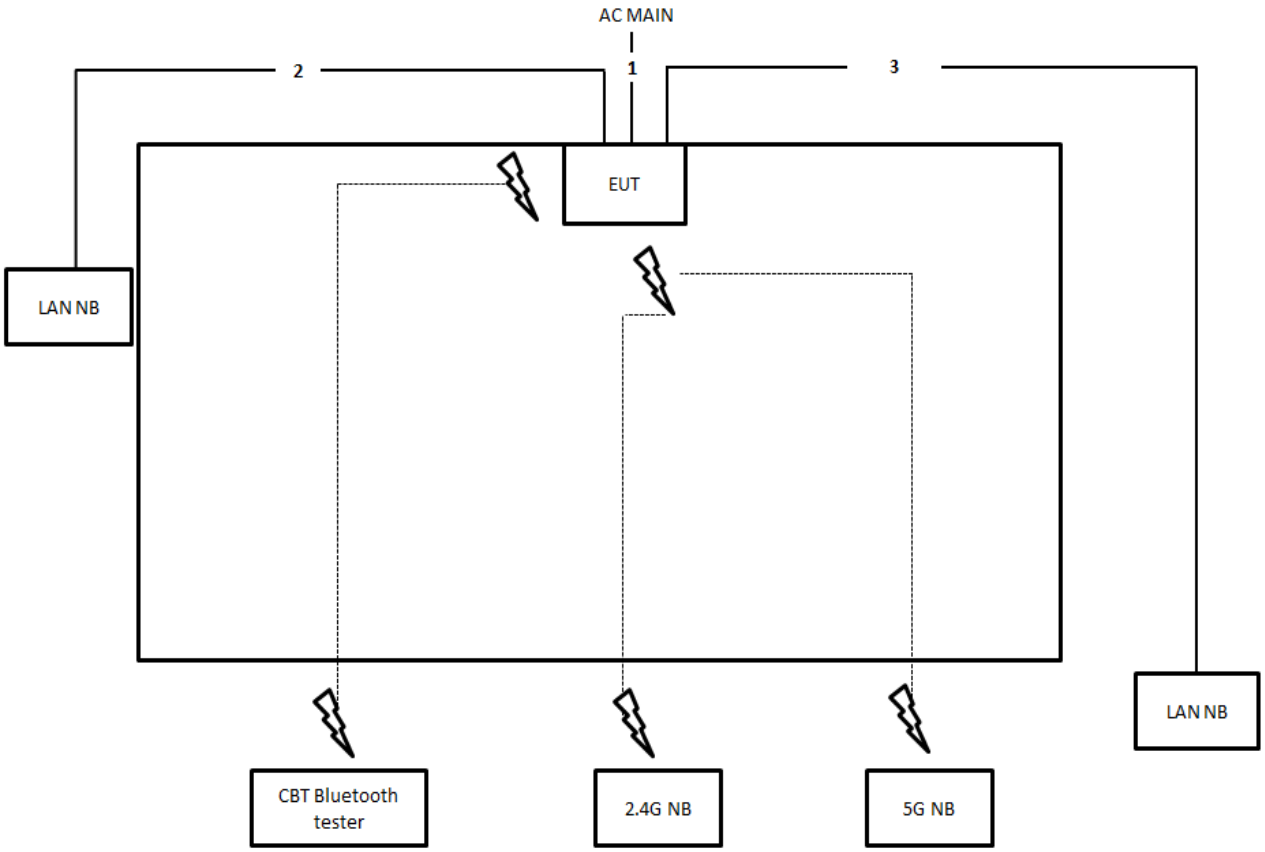
Item	Connection	Shielded	Length
1	Power cable	No	1.5m
2	RJ-45 cable	No	10m
3	RJ-45 cable	No	10m
4	RJ-45 cable	No	1m

Test Setup Diagram - Radiated Test < 1GHz
Operating Mode: Intentional - CTX



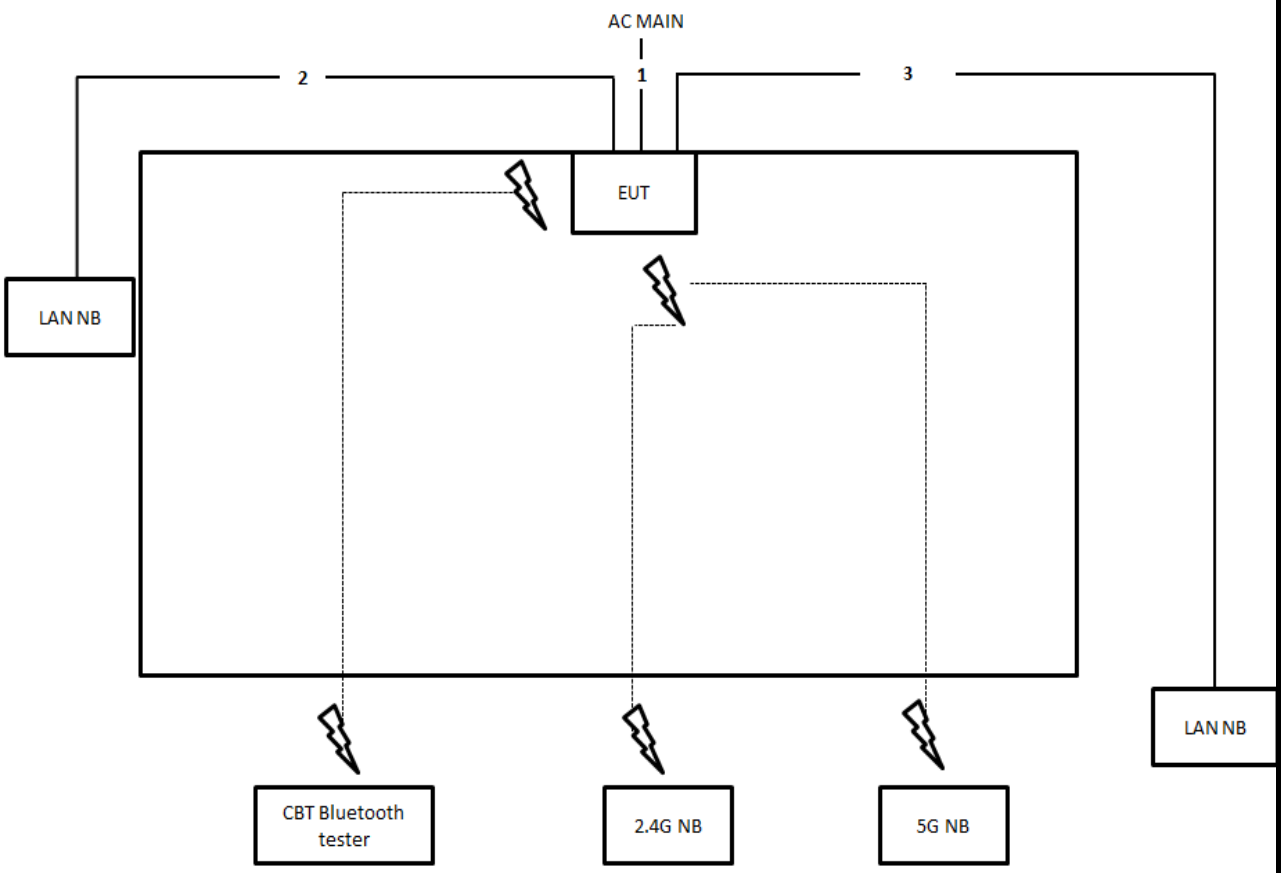
Item	Connection	Shielded	Length
1	Power cable	No	1.5m
2	RJ-45 cable	No	10m
3	RJ-45 cable	No	1.5m
4	RJ-45 cable	No	1.5m

Test Setup Diagram - Radiated Test < 1GHz
Operating Mode: Unintentional - Normal Link



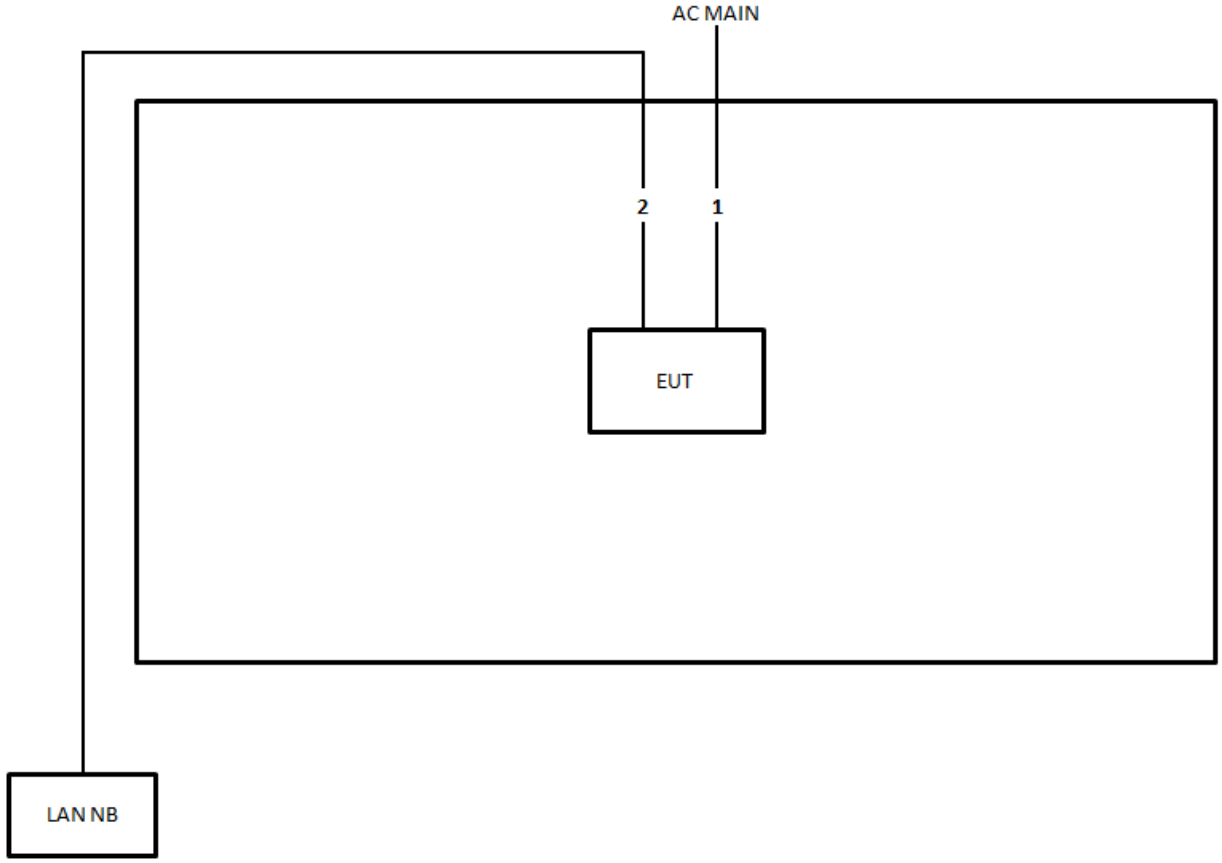
Item	Connection	Shielded	Length
1	Power cable	No	1.5m
2	RJ-45 cable	No	10m
3	RJ-45 cable	No	10m

Test Setup Diagram - Radiated Test > 1GHz
Operating Mode: Unintentional 1~5th



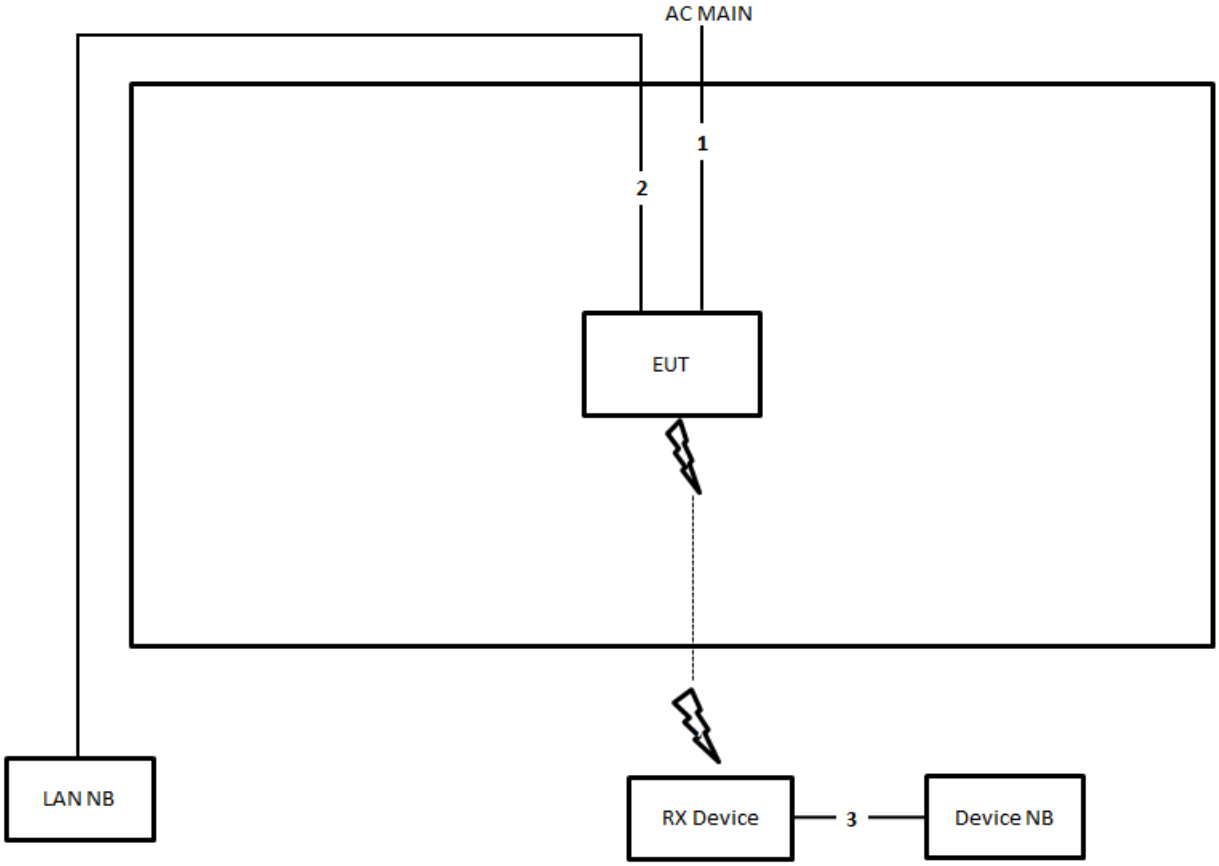
Item	Connection	Shielded	Length
1	Power cable	No	1.5m
2	RJ-45 cable	No	10m
3	RJ-45 cable	No	10m

Test Setup Diagram - Radiated Test > 1GHz / Operating Mode: Intentional 1~10th
For non-beamforming mode



Item	Connection	Shielded	Length
1	Power cable	No	1.5m
2	RJ-45 cable	No	10m

Test Setup Diagram - Radiated Test > 1GHz / Operating Mode: Intentional 1~10th
For beamforming mode



Item	Connection	Shielded	Length
1	Power cable	No	1.5m
2	RJ-45 cable	No	10m
3	RJ-45 cable	No	1.5m

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

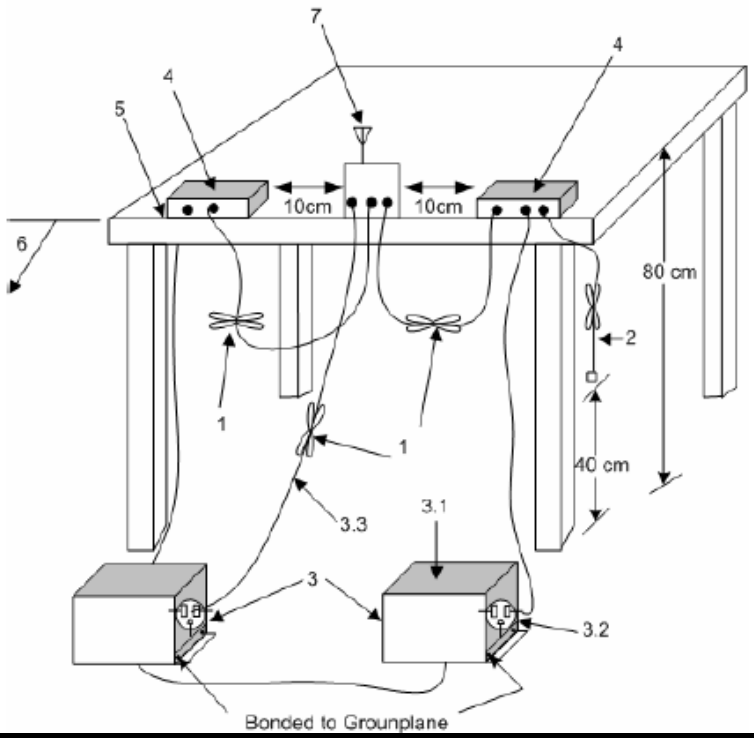
Refer a test equipment and calibration data table in this test report.

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

AC Power-line Conducted Emissions



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 ≥ 500 kHz.

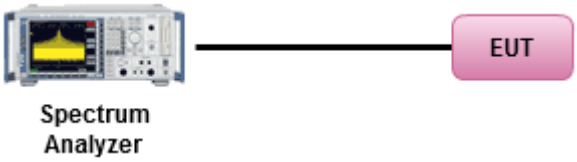
3.2.2 Measuring Instruments

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 8.1 Option 1 for6 dB bandwidth measurement.
	☐ Refer as FCC KDB 558074, clause 8.2 Option 2 for6 dB bandwidth measurement.
	☐ Refer as ANSI C63.10, clause 6.9.1 for occupied bandwidth testing.

3.2.4 Test Setup

Emission Bandwidth


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 9.1.1 Option 1 (RBW ≥ EBW method).
	☐ Refer as FCC KDB 558074, clause 9.1.2 Option 2 (peak power meter for VBW ≥ DTS BW)
▪ Maximum Conducted Output Power	
	[duty cycle ≥ 98% or external video / power trigger]
	☐ Refer as FCC KDB 558074, clause 9.2.2.2 Method AVGSA-1 (spectral trace averaging).
	☐ Refer as FCC KDB 558074, clause 9.2.2.3 Method AVGSA-1 Alt. (slow sweep speed)
	duty cycle < 98% and average over on/off periods with duty factor
	☐ Refer as FCC KDB 558074, clause 9.2.2.4 Method AVGSA-2 (spectral trace averaging).
	☐ Refer as FCC KDB 558074, clause 9.2.2.5 Method AVGSA-2 Alt. (slow sweep speed)
	RF power meter and average over on/off periods with duty factor or gated trigger
	☒ Refer as FCC KDB 558074, clause 9.2.3 Method AVGPM-G (using an 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: $P_{total} = P_1 + P_2 + \ldots + P_n$ (calculated in linear unit [mW] and transfer to log unit [dBm]) $EIRP_{total} = P_{total} + DG$

3.3.4 Test Setup

Maximum Conducted Output Power (Power Meter)

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

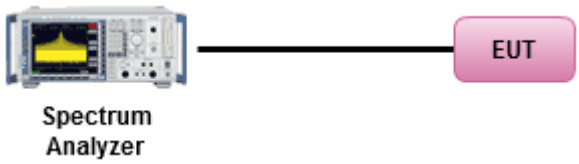
Refer a test equipment and calibration data table in this test report.

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 10.2 Method PKPSD (RBW=3-100kHz; Detector=peak).		
	[duty cycle ≥ 98% or external video / power trigger]		
	☐ Refer as FCC KDB 558074, clause 10.3 Method AVGPSD-1 (spectral trace averaging).		
	☐ Refer as FCC KDB 558074, clause 10.4 Method AVGPSD-2 (slow sweep speed)		
	duty cycle < 98% and average over on/off periods with duty factor		
	☐ Refer as FCC KDB 558074, clause 10.5 Method AVGPSD-1 Alt (spectral trace averaging).		
	☐ Refer as FCC KDB 558074, clause 10.6 Method AVGPSD-2 Alt. (slow sweep speed)		
▪ 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

Power Spectral Density



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 (dB)**
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

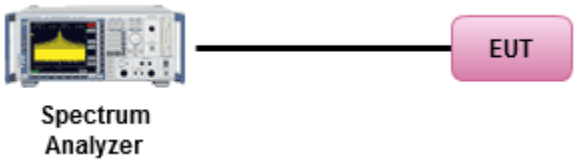
Refer a test equipment and calibration data table in this test report.

3.5.3 Test Procedures

Test Method
▪ Refer as FCC KDB 558074, clause 11 for unwanted emissions into non-restricted bands.

3.5.4 Test Setup

Emissions in Non-restricted Frequency Bands



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 below30 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.

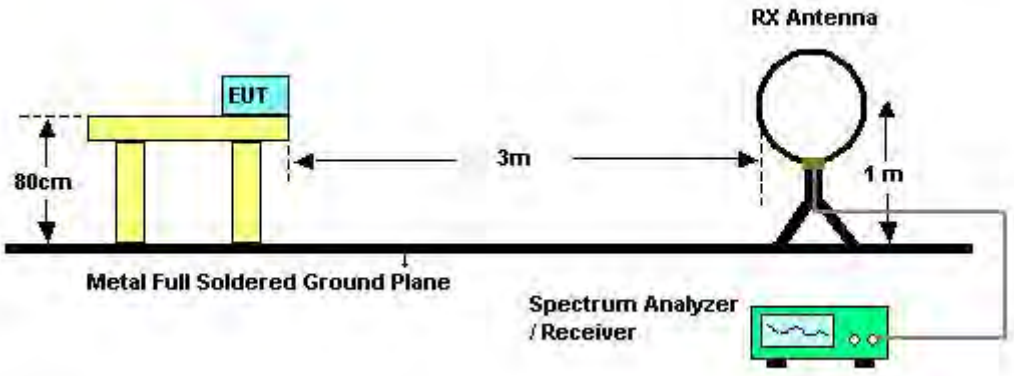
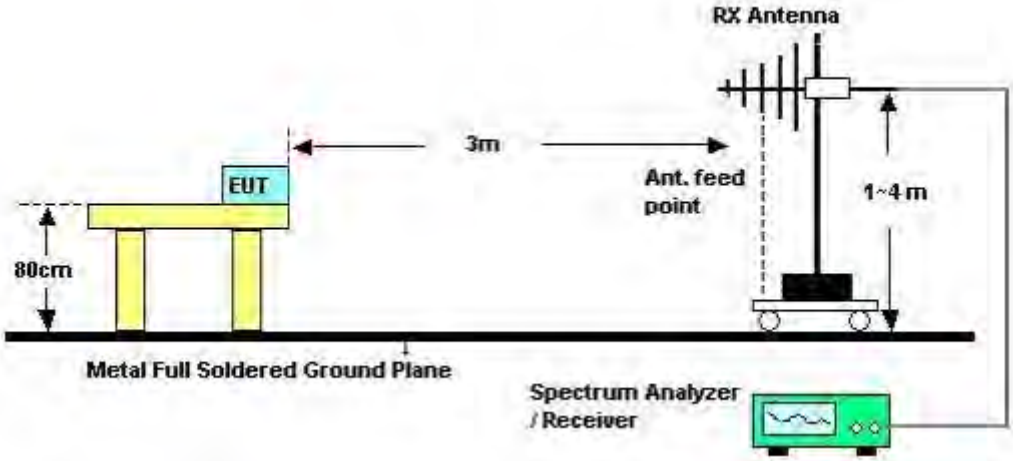
3.6.2 Measuring Instruments

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

3.6.3 Test Procedures

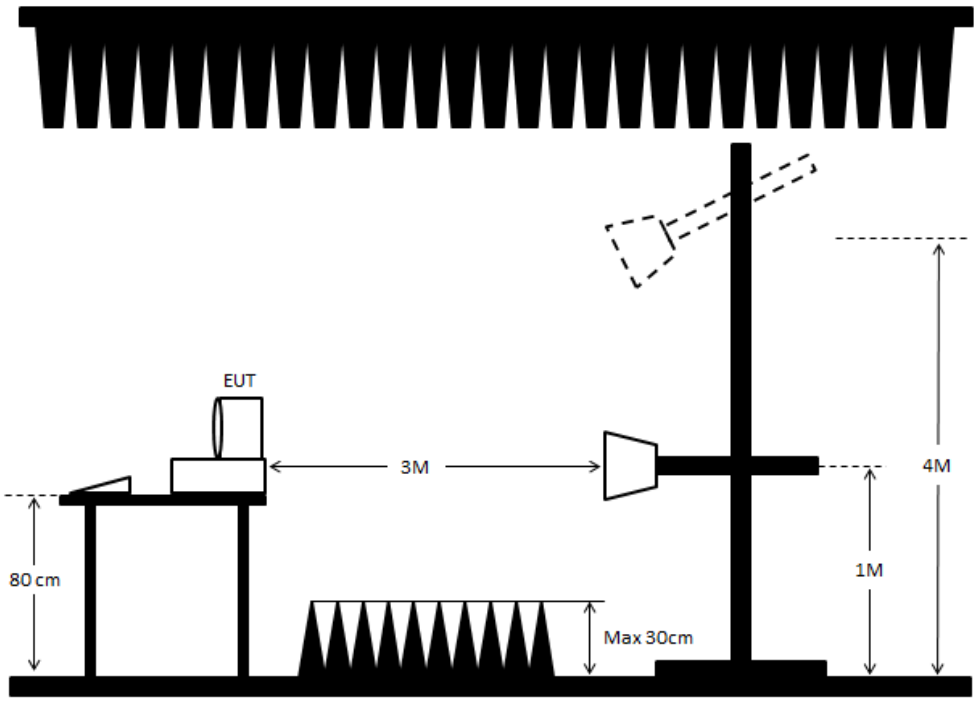
Test Method		
▪ The average emission levels shall be measured in [duty cycle ≥ 98 or duty factor].		
▪ Refer as ANSI C63.10, clause 6.9.2.2 band-edge testing shall be performed at the lowest frequency channel and highest frequency channel within the allowed operating band.		
▪ For the transmitter unwanted emissions shall be measured using following options below:		
	▪ Refer as FCC KDB 558074, clause 12 for unwanted emissions into restricted bands.	
		☐ Refer as FCC KDB 558074, clause 12.2.5.1 Option 1 (trace averaging for duty cycle ≥98%)
		☐ Refer as FCC KDB 558074, clause 12.2.5.2 Option 2 (trace averaging + duty factor).
		☒ Refer as FCC KDB 558074, clause 12.2.5.3 Option 3 (Reduced VBW≥1/T).
		☐ Refer as ANSI C63.10, clause 4.2.3.2.3 (Reduced VBW). VBW ≥ 1/T, where T is pulse time.
		☐ Refer as ANSI C63.10, clause 4.2.3.2.4 average value of pulsed emissions.
		☒ Refer as FCC KDB 558074, clause 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 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 13.2 (ANSI C63.10, clause 6.9.3) for marker-delta method for band-edge measurements.	
	▪ Refer as FCC KDB 558074, clause 13.3 for narrower resolution bandwidth (100kHz) using the band power and summing the spectral levels (i.e., 1 MHz).	
▪ For conducted and cabinet radiation measurement, refer as FCC KDB 558074, clause 12.2.2.		
	▪ 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

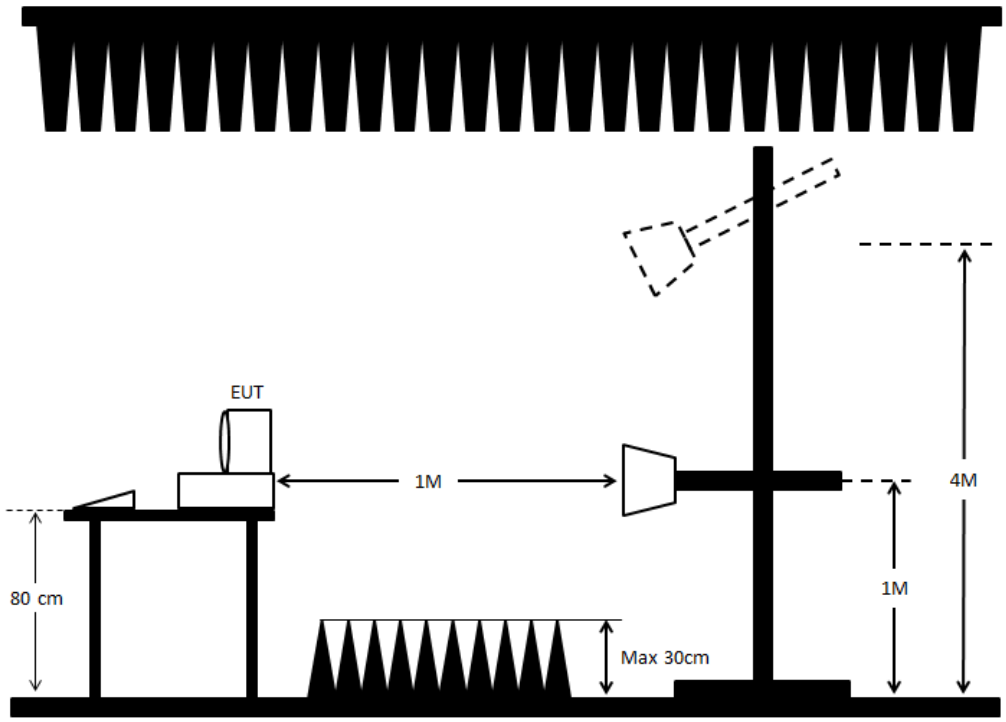
Transmitter Radiated Emissions
9kHz ~30MHz

30MHz~1GHz


Unintentional 1GHz~5th Harmonic

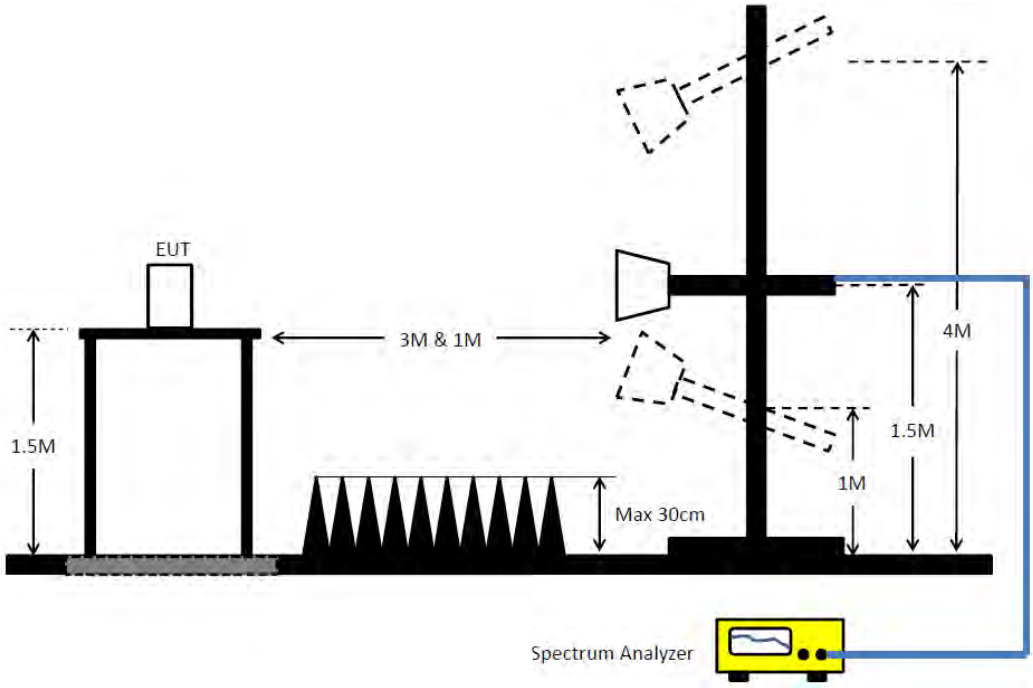
1,000~18,000 MHz



18,000~30,000 MHz



Above 1GHz



3.6.5 Transmitter Radiated Unwanted Emissions (Below 30MHz)

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

3.6.6 Transmitter Radiated Unwanted Emissions

Refer as Appendix F

4 Test Equipment and Calibration Data

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
EMI Receiver	Agilent	N9038A	My52260123	9kHz ~ 8.45GHz	Jan. 23, 2017	Conduction (CO01-CB)
LISN	F.C.C.	FCC-LISN-50-16-2	04083	150kHz~100MHz	Dec. 14, 2016	Conduction (CO01-CB)
LISN	Schwarzbeck	NSLK 8127	8127647	9kHz ~ 30MHz	Dec. 21, 2016	Conduction (CO01-CB)
COND Cable	Woken	Cable	01	150kHz ~ 30MHz	May 24, 2016	Conduction (CO01-CB)
COND Cable	Woken	Cable	01	150kHz ~ 30MHz	May 23, 2017	Conduction (CO01-CB)
Software	Audix	E3	6.120210n	-	N.C.R.	Conduction (CO01-CB)
BILOG ANTENNA with 6dB Attenuator	TESEQ & EMCI	CBL6112D & N-6-06	37880 & AT-N0609	20MHz ~ 2GHz	Aug. 30, 2016	Radiation (03CH01-CB)
Loop Antenna	Teseq	HLA 6120	24155	9kHz - 30 MHz	Mar. 16, 2016*	Radiation (03CH01-CB)
Horn Antenna	EMCO	3115	00075790	750MHz ~ 18GHz	Nov. 10, 2016	Radiation (03CH01-CB)
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Jul. 25, 2016	Radiation (03CH01-CB)
Pre-Amplifier	EMCI	EMC330N	980332	20MHz ~ 3GHz	May 02, 2017	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8449B	3008A02310	1GHz ~ 26.5GHz	Jan. 16, 2017	Radiation (03CH01-CB)
Pre-Amplifier	MITEQ	TTA1840-35-HG	1864479	18GHz ~ 40GHz	Jun. 28, 2016	Radiation (03CH01-CB)
Spectrum Analyzer	R&S	FSP40	100056	9kHz ~ 40GHz	Nov. 22, 2016	Radiation (03CH01-CB)
EMI Test	R&S	ESCS	100355	9kHz ~ 2.75GHz	May 16, 2016	Radiation (03CH01-CB)
EMI Test	R&S	ESCS	100355	9kHz ~ 2.75GHz	May 06, 2017	Radiation (03CH01-CB)
RF Cable-low	Woken	Low Cable-16+17	N/A	30 MHz ~ 1 GHz	Oct. 24, 2016	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-16	N/A	1 GHz ~ 18 GHz	Oct. 24, 2016	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-16+17	N/A	1 GHz ~ 18 GHz	Oct. 24, 2016	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-40G#1	N/A	18GHz ~ 40 GHz	Oct. 24, 2016	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-40G#2	N/A	18GHz ~ 40 GHz	Oct. 24, 2016	Radiation (03CH01-CB)
Test Software	Audix	E3	6.2009-l0-7	N/A	N/A	Radiation (03CH01-CB)

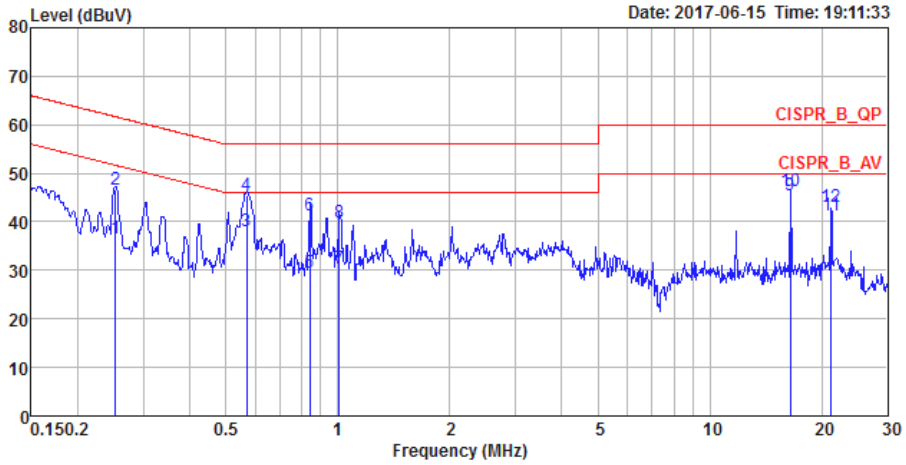
Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Spectrum analyzer	R&S	FSV40	100979	9kHz~40GHz	Dec. 26, 2016	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-6	1 GHz–26.5 GHz	Oct. 24, 2016	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-7	1 GHz –26.5 GHz	Oct. 24, 2016	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-8	1 GHz –26.5 GHz	Oct. 24, 2016	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-9	1 GHz –26.5 GHz	Oct. 24, 2016	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-10	1 GHz –26.5 GHz	Oct. 24, 2016	Conducted (TH01-CB)
Power Sensor	Agilent	U2021XA	MY53410001	50MHz~18GHz	Nov. 22, 2016	Conducted (TH01-CB)

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

"*" Calibration Interval of instruments listed above is two years.

N.C.R. means Non-Calibration required.

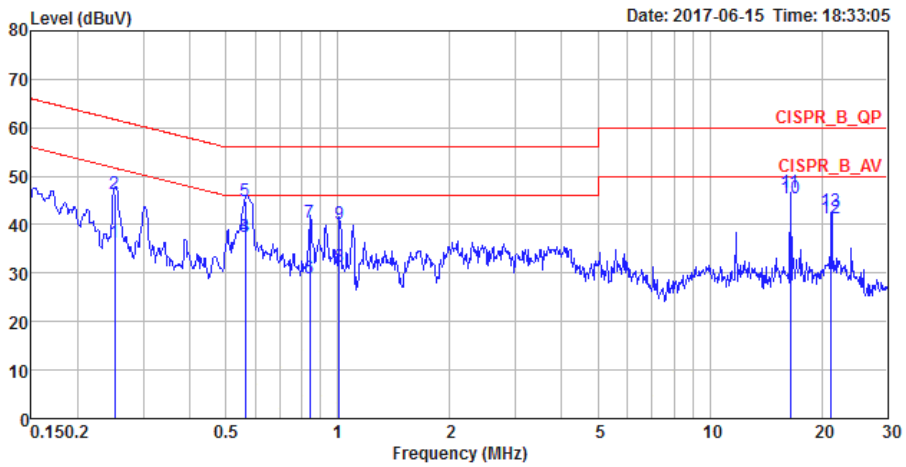
AC Power-line Conducted Emissions Result			
Operating Mode	8	**Power Phase**	Neutral
Operating Function	Intentional - CTX		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark	Pol/Phase
	MHz	dBuV	dB	dBuV	dBuV	dB	dB		
1	0.2521	36.72	-14.97	51.69	26.55	10.08	0.09	Average	NEUTRAL
2	0.2521	46.56	-15.13	61.69	36.39	10.08	0.09	QP	NEUTRAL
3	0.5696	38.06	-7.94	46.00	27.78	10.20	0.08	Average	NEUTRAL
4	0.5696	45.53	-10.47	56.00	35.25	10.20	0.08	QP	NEUTRAL
5	0.8413	29.58	-16.42	46.00	19.33	10.10	0.15	Average	NEUTRAL
6	0.8413	41.34	-14.66	56.00	31.09	10.10	0.15	QP	NEUTRAL
7	1.0084	30.39	-15.61	46.00	20.15	10.05	0.19	Average	NEUTRAL
8	1.0084	39.91	-16.09	56.00	29.67	10.05	0.19	QP	NEUTRAL
9	16.4646	45.35	-4.65	50.00	34.87	10.29	0.19	Average	NEUTRAL
10	16.4646	46.32	-13.68	60.00	35.84	10.29	0.19	QP	NEUTRAL
11	21.1676	41.28	-8.72	50.00	30.70	10.37	0.21	Average	NEUTRAL
12	21.1676	43.01	-16.99	60.00	32.43	10.37	0.21	QP	NEUTRAL

Note 1: “>20dB” means emission levels that exceed the level of 20 dB below the applicable limit.
Note 2: “N/F” means Nothing Found emissions (No emissions were detected.)

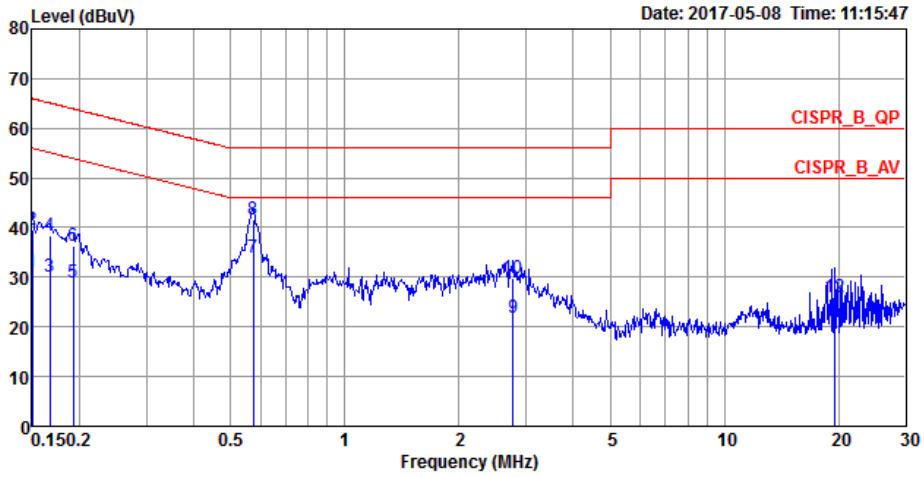
AC Power-line Conducted Emissions Result			
Operating Mode	8	**Power Phase**	Line
Operating Function	Intentional - CTX		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark	Pol/Phase
	MHz	dBuV	dB	dBuV	dBuV	dB	dB		
1	0.2515	36.42	-15.29	51.71	26.41	9.92	0.09	Average	LINE
2	0.2515	46.39	-15.32	61.71	36.38	9.92	0.09	QP	LINE
3	0.5637	37.61	-8.39	46.00	27.58	9.95	0.08	Average	LINE
4	0.5637	37.64	-8.36	46.00	27.61	9.95	0.08	Average	LINE
5	0.5637	44.97	-11.03	56.00	34.94	9.95	0.08	QP	LINE
6	0.8396	28.86	-17.14	46.00	18.75	9.96	0.15	Average	LINE
7	0.8396	40.48	-15.52	56.00	30.37	9.96	0.15	QP	LINE
8	1.0107	31.14	-14.86	46.00	20.99	9.96	0.19	Average	LINE
9	1.0107	40.08	-15.92	56.00	29.93	9.96	0.19	QP	LINE
10	16.4638	45.58	-4.42	50.00	35.12	10.27	0.19	Average	LINE
11	16.4638	46.51	-13.49	60.00	36.05	10.27	0.19	QP	LINE
12	21.1682	41.22	-8.78	50.00	30.65	10.36	0.21	Average	LINE
13	21.1682	42.93	-17.07	60.00	32.36	10.36	0.21	QP	LINE

Note 1: “>20dB” means emission levels that exceed the level of 20 dB below the applicable limit.
Note 2: “N/F” means Nothing Found emissions (No emissions were detected.)

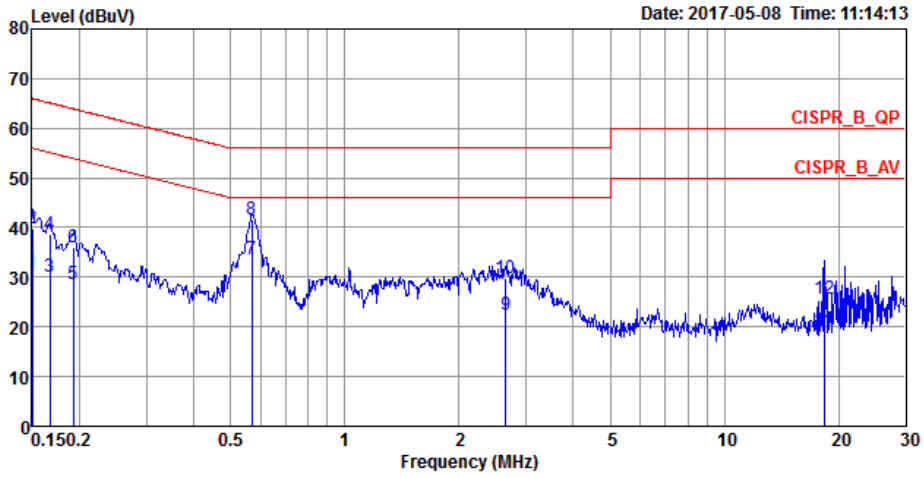
AC Power-line Conducted Emissions Result			
Operating Mode	2	**Power Phase**	Neutral
Operating Function	Unintentional - Normal Link		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark	Pol/Phase
	MHz	dBuV	dB	dBuV	dBuV	dB	dB		
1	0.1500	30.99	-25.01	56.00	21.01	9.94	0.04	Average	NEUTRAL
2	0.1500	39.68	-26.32	66.00	29.70	9.94	0.04	QP	NEUTRAL
3	0.1668	30.23	-24.89	55.12	20.24	9.95	0.04	Average	NEUTRAL
4	0.1668	38.46	-26.66	65.12	28.47	9.95	0.04	QP	NEUTRAL
5	0.1924	28.79	-25.14	53.93	18.76	9.98	0.05	Average	NEUTRAL
6	0.1924	36.36	-27.57	63.93	26.33	9.98	0.05	QP	NEUTRAL
7	0.5731	34.03	-11.97	46.00	24.01	9.97	0.05	Average	NEUTRAL
8	0.5731	41.56	-14.44	56.00	31.54	9.97	0.05	QP	NEUTRAL
9	2.7794	21.80	-24.20	46.00	11.68	10.02	0.10	Average	NEUTRAL
10	2.7794	29.72	-26.28	56.00	19.60	10.02	0.10	QP	NEUTRAL
11	19.5316	19.29	-30.71	50.00	8.75	10.29	0.25	Average	NEUTRAL
12	19.5316	26.05	-33.95	60.00	15.51	10.29	0.25	QP	NEUTRAL

Note 1: “>20dB” means emission levels that exceed the level of 20 dB below the applicable limit.
Note 2: “N/F” means Nothing Found emissions (No emissions were detected.)

AC Power-line Conducted Emissions Result			
Operating Mode	2	**Power Phase**	Line
Operating Function	Unintentional - Normal Link		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark	Pol/Phase
	MHz	dBuV	dB	dBuV	dBuV	dB	dB		
1	0.1500	31.09	-24.91	56.00	21.10	9.95	0.04	Average	LINE
2	0.1500	39.75	-26.25	66.00	29.76	9.95	0.04	QP	LINE
3	0.1668	30.20	-24.92	55.12	20.22	9.94	0.04	Average	LINE
4	0.1668	38.75	-26.37	65.12	28.77	9.94	0.04	QP	LINE
5	0.1924	28.76	-25.17	53.93	18.78	9.93	0.05	Average	LINE
6	0.1924	35.95	-27.98	63.93	25.97	9.93	0.05	QP	LINE
7	0.5701	33.70	-12.30	46.00	23.73	9.92	0.05	Average	LINE
8	0.5701	41.51	-14.49	56.00	31.54	9.92	0.05	QP	LINE
9	2.6500	22.44	-23.56	46.00	12.35	9.99	0.10	Average	LINE
10	2.6500	29.82	-26.18	56.00	19.73	9.99	0.10	QP	LINE
11	18.3284	19.21	-30.79	50.00	8.77	10.20	0.24	Average	LINE
12	18.3284	25.77	-34.23	60.00	15.33	10.20	0.24	QP	LINE

Note 1: “>20dB” means emission levels that exceed the level of 20 dB below the applicable limit.
Note 2: “N/F” means Nothing Found emissions (No emissions were detected.)

Summary

Mode	Max-N dB (Hz)	Max-OBW (Hz)	ITU-Code	Min-N dB (Hz)	Min-OBW (Hz)
BT-LE(1Mbps)	-	-	-	-	-
2.4-2.4835GHz	666.25k	1.049M	1M05F1D	652.5k	1.046M

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;

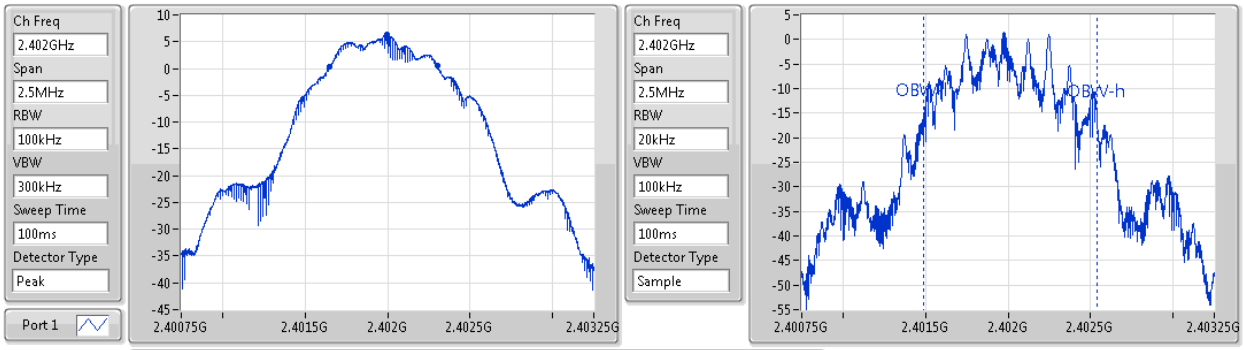
Result

Mode	Result	Limit (Hz)	Port 1-N dB (Hz)	Port 1-OBW (Hz)
BT-LE(1Mbps)	-	-	-	-
2402MHz	Pass	500k	652.5k	1.046M
2442MHz	Pass	500k	653.75k	1.047M
2480MHz	Pass	500k	666.25k	1.049M

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

BT-LE(1Mbps) **EBW**

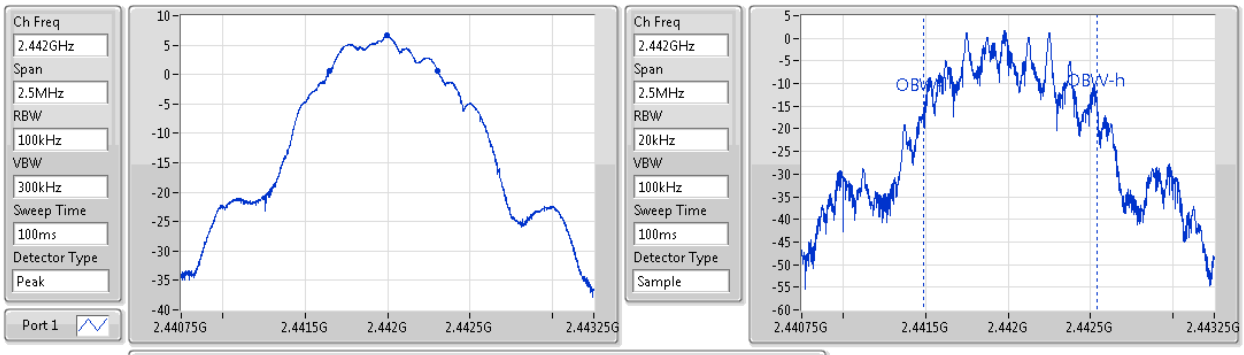
2402MHz



6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
652.5k	2.401649G	2.402301G	1.046M	2.401492G	2.402537G	500k	1

BT-LE(1Mbps) **EBW**

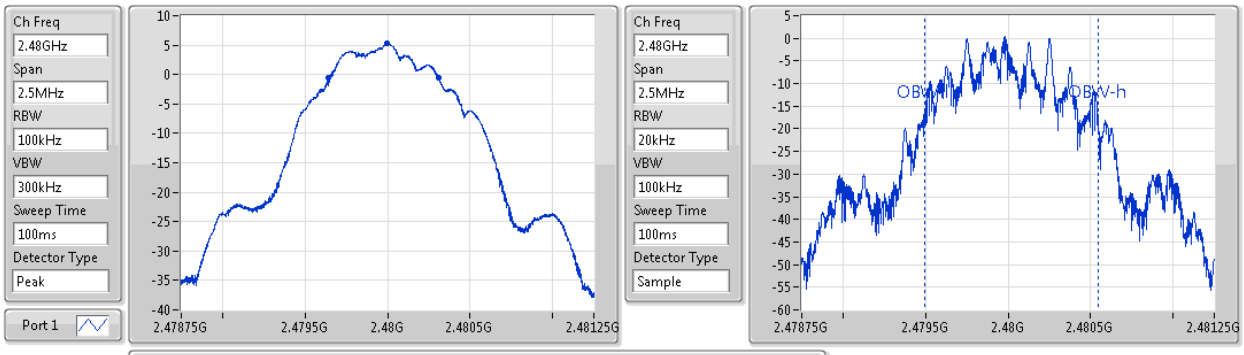
2442MHz



6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
653.75k	2.441651G	2.442305G	1.047M	2.441492G	2.442538G	500k	1

BT-LE(1Mbps) **EBW**

2480MHz



6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
666.25k	2.479644G	2.48031G	1.049M	2.479494G	2.480543G	500k	1

Summary

Mode	Power	Power
	(dBm)	(W)
BT-LE(1Mbps)	-	-
2.4-2.4835GHz	7.28	0.00535

Result

Mode	Result	Gain (dBi)	Power (dBm)	Power Limit (dBm)
BT-LE(1Mbps)	-	-	-	-
2402MHz	Pass	3.70	7.06	30.00
2442MHz	Pass	3.70	7.28	30.00
2480MHz	Pass	3.70	6.14	30.00

Summary

Mode	PD (dBm/RBW)
BT-LE(1Mbps)	-
2.4-2.4835GHz	-5.83

RBW=3kHz.

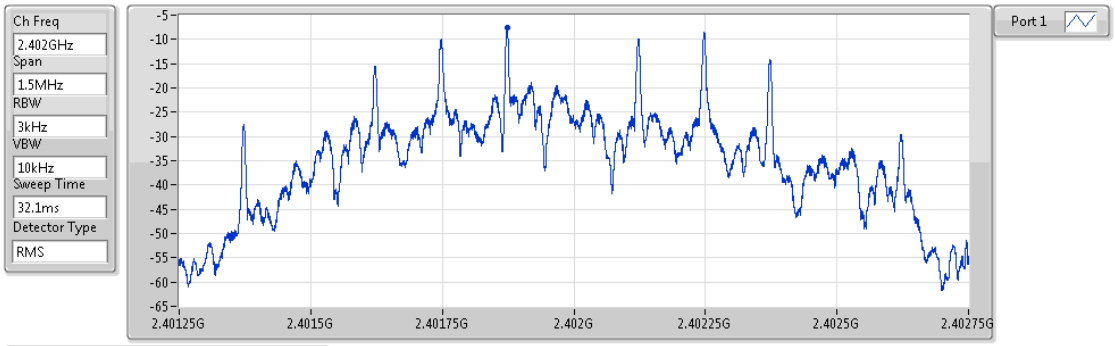
Result

Mode	Result	Gain (dBi)	PD (dBm/RBW)	PD Limit (dBm/RBW)
BT-LE(1Mbps)	-	-	-	-
2402MHz	Pass	3.70	-7.52	8.00
2442MHz	Pass	3.70	-5.83	8.00
2480MHz	Pass	3.70	-8.72	8.00

RBW=3kHz.

BT-LE(1Mbps) **PSD**

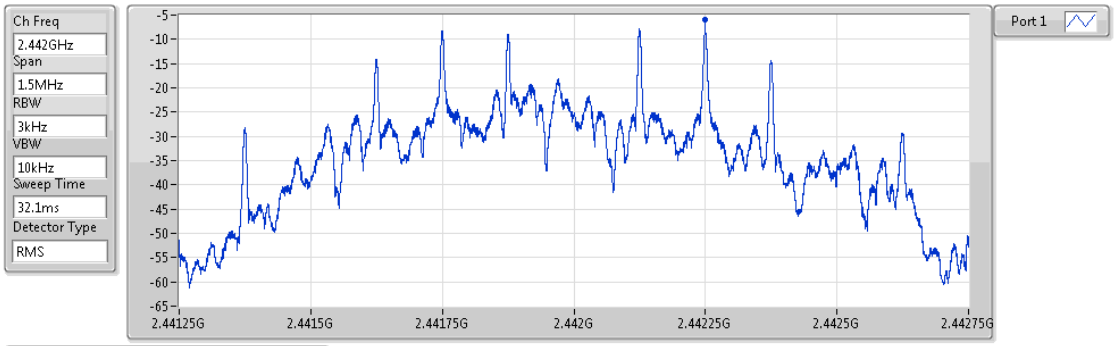
2402MHz



Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-7.52	-7.52	-7.52

BT-LE(1Mbps) **PSD**

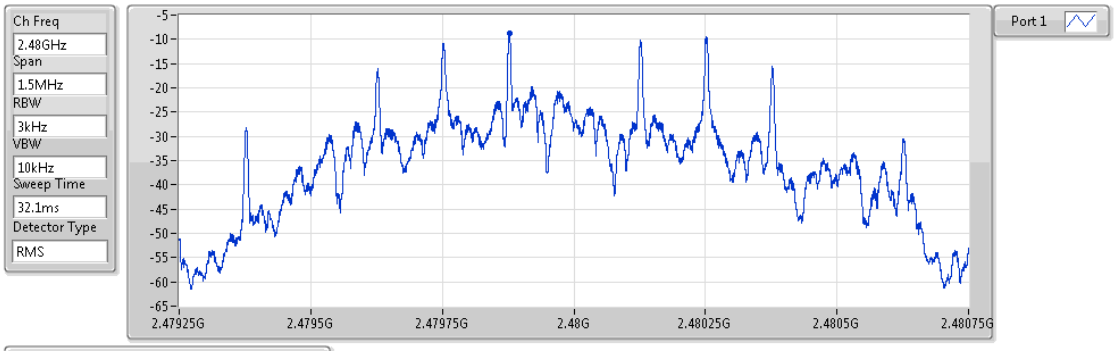
2442MHz



Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-5.83	-5.83	-5.83

BT-LE(1Mbps) **PSD**

2480MHz



Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-8.72	-8.72	-8.72

Summary

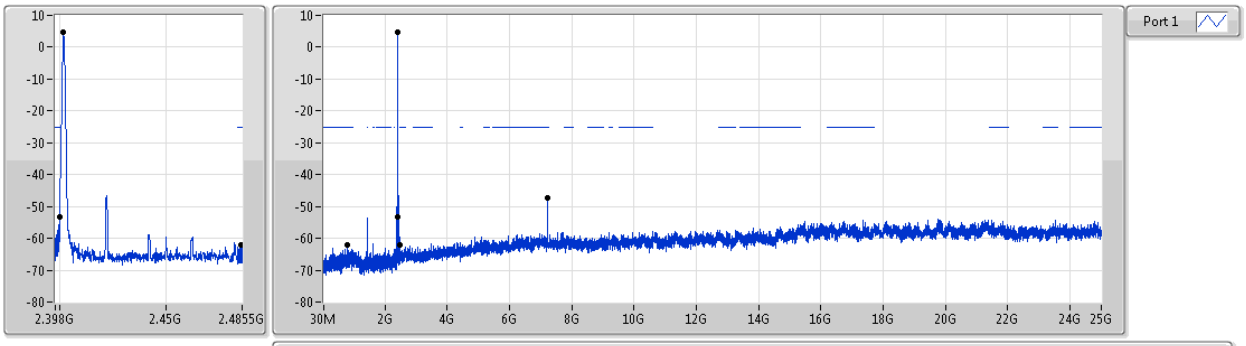
Mode	Result	Ref (Hz)	Ref (dBm)	Limit (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Port
BT-LE(1Mbps)	-	-	-	-	-	-	-	-	-	-	-	-	-
2.4-2.4835GHz	Pass	2.40167G	4.79	-25.21	770M	-62.04	2.399856G	-53.40	2.485092G	-62.03	7.205102G	-47.30	1

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)	Port
BT-LE(1Mbps)	-	-	-	-	-	-	-	-	-	-	-	-	-
2402MHz	Pass	2.40167G	4.79	-25.21	770M	-62.04	2.399856G	-53.40	2.485092G	-62.03	7.205102G	-47.30	1
2442MHz	Pass	2.442084G	6.27	-23.73	2.035696G	-62.48	2.398176G	-63.08	2.484336G	-62.93	15.332837G	-54.20	1
2480MHz	Pass	2.479993G	5.30	-24.70	1.7764G	-63.20	2.399216G	-62.69	2.484052G	-59.03	24.808627G	-53.23	1

BT-LE(1Mbps) **CSE NdB**

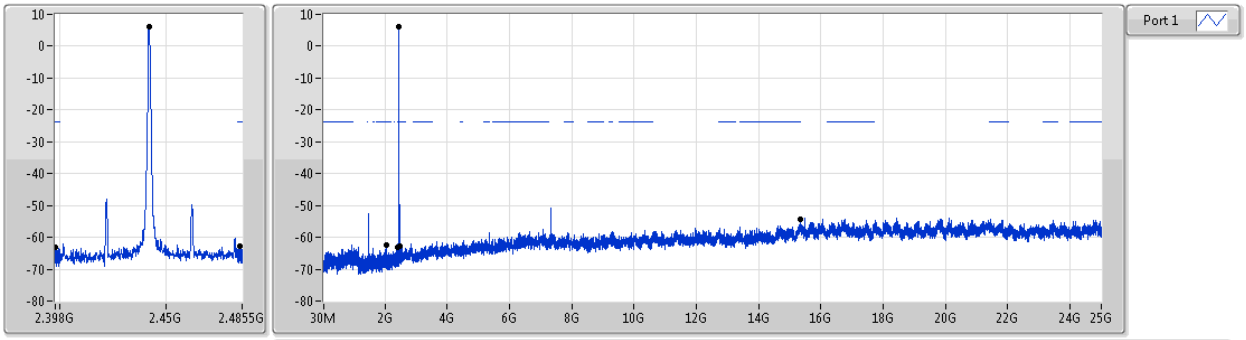
2402MHz



Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.40167G	4.79	-25.21	770M	-62.04	2.399856G	-53.40	2.485092G	-62.03	7.205102G	-47.30	1

BT-LE(1Mbps) **CSE NdB**

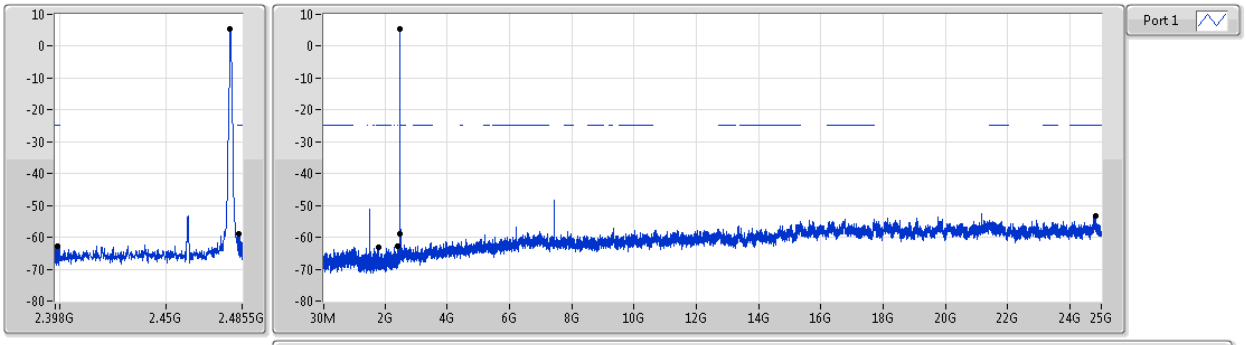
2442MHz



Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.442084G	6.27	-23.73	2.035696G	-62.48	2.398176G	-63.08	2.484336G	-62.93	15.332837G	-54.20	1

BT-LE(1Mbps) **CSE NdB**

2480MHz

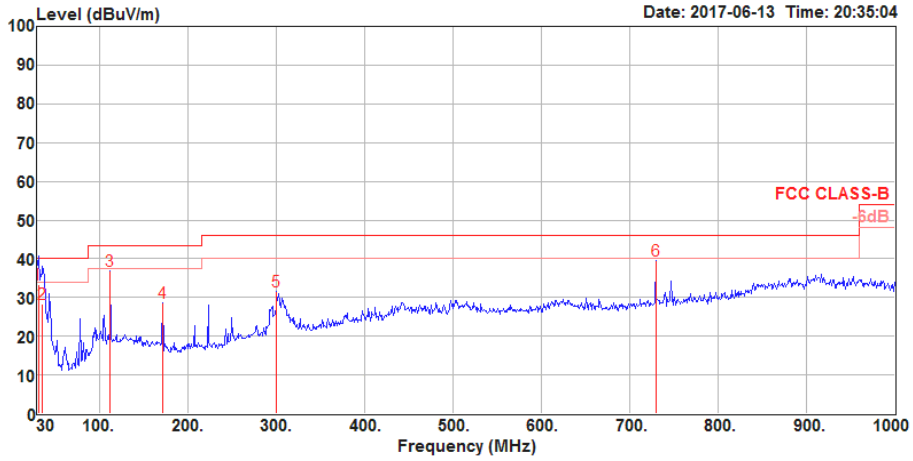


Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.479993G	5.30	-24.70	1.7764G	-63.20	2.399216G	-62.69	2.484052G	-59.03	24.808627G	-53.23	1

TEL : 886-3-327-3456

FAX : 886-3-327-0973

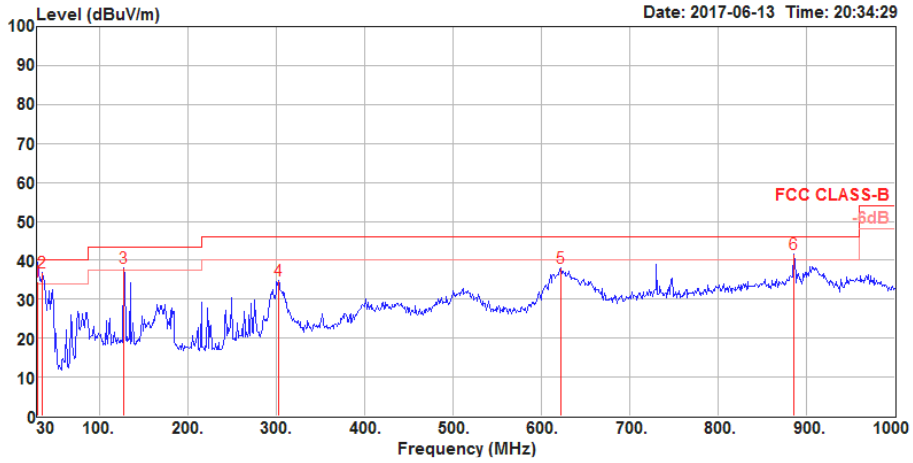
RSE below 1GHz Result			
Operating Mode	2	**Polarization**	Horizontal
Operating Function	Intentional - CTX		



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	30.97	33.49	40.00	-6.51	40.27	0.64	25.01	32.43	100	140	QP	HORIZONTAL
2	35.82	28.38	40.00	-11.62	37.95	0.69	22.17	32.43	100	75	QP	HORIZONTAL
3	112.45	36.95	43.50	-6.55	49.76	1.23	18.33	32.37	300	1	Peak	HORIZONTAL
4	171.62	28.71	43.50	-14.79	43.57	1.51	15.95	32.32	300	1	Peak	HORIZONTAL
5	300.63	31.51	46.00	-14.49	42.08	2.00	19.70	32.27	200	283	Peak	HORIZONTAL
6	729.37	39.55	46.00	-6.45	42.82	3.14	25.86	32.27	100	304	Peak	HORIZONTAL

Note 1: “>20dB” means emission levels that exceed the level of 20 dB below the applicable limit.
Note 2: “N/F” means Nothing Found emissions (No emissions were detected.)

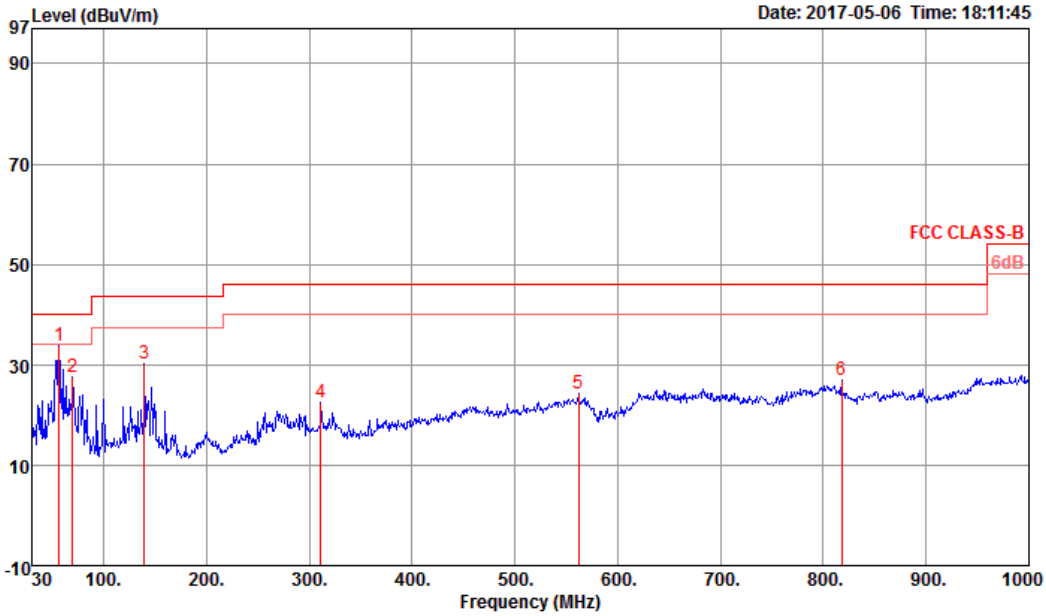
RSE below 1GHz Result			
Operating Mode	2	**Polarization**	Vertical
Operating Function	Intentional - CTX		



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	30.00	34.64	40.00	-5.36	40.84	0.63	25.60	32.43	200	30	QP	VERTICAL
2	35.82	36.82	40.00	-3.18	46.39	0.69	22.17	32.43	100	239	Peak	VERTICAL
3	127.00	37.96	43.50	-5.54	50.47	1.30	18.55	32.36	150	246	Peak	VERTICAL
4	302.57	34.81	46.00	-11.19	45.31	2.01	19.76	32.27	200	223	Peak	VERTICAL
5	621.70	37.99	46.00	-8.01	42.36	2.89	25.12	32.38	100	188	Peak	VERTICAL
6	885.54	41.64	46.00	-4.36	42.42	3.47	27.41	31.66	100	195	Peak	VERTICAL

Note 1: “>20dB” means emission levels that exceed the level of 20 dB below the applicable limit.
Note 2: “N/F” means Nothing Found emissions (No emissions were detected.)

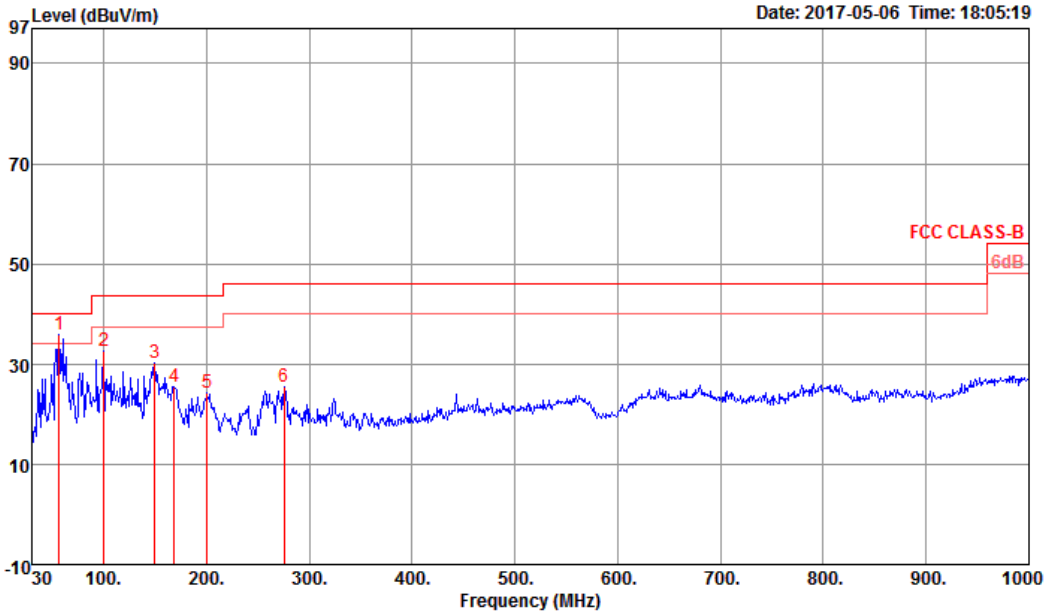
RSE below 1GHz Result			
Operating Mode	1	**Polarization**	Horizontal
Operating Function	Unintentional - Normal Link		



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	56.19	33.67	40.00	-6.33	48.26	0.43	13.34	28.36	100	0	Peak	HORIZONTAL
2	69.77	27.66	40.00	-12.34	43.09	0.48	12.40	28.31	100	0	Peak	HORIZONTAL
3	139.61	30.27	43.50	-13.23	39.54	0.89	17.80	27.96	100	0	Peak	HORIZONTAL
4	311.30	22.59	46.00	-23.41	28.51	1.54	20.02	27.48	100	0	Peak	HORIZONTAL
5	561.56	24.27	46.00	-21.73	26.15	2.19	24.58	28.65	100	0	Peak	HORIZONTAL
6	817.64	26.82	46.00	-19.18	25.38	2.84	26.79	28.19	100	0	Peak	HORIZONTAL

Note 1: “>20dB” means emission levels that exceed the level of 20 dB below the applicable limit.
Note 2: “N/F” means Nothing Found emissions (No emissions were detected.)

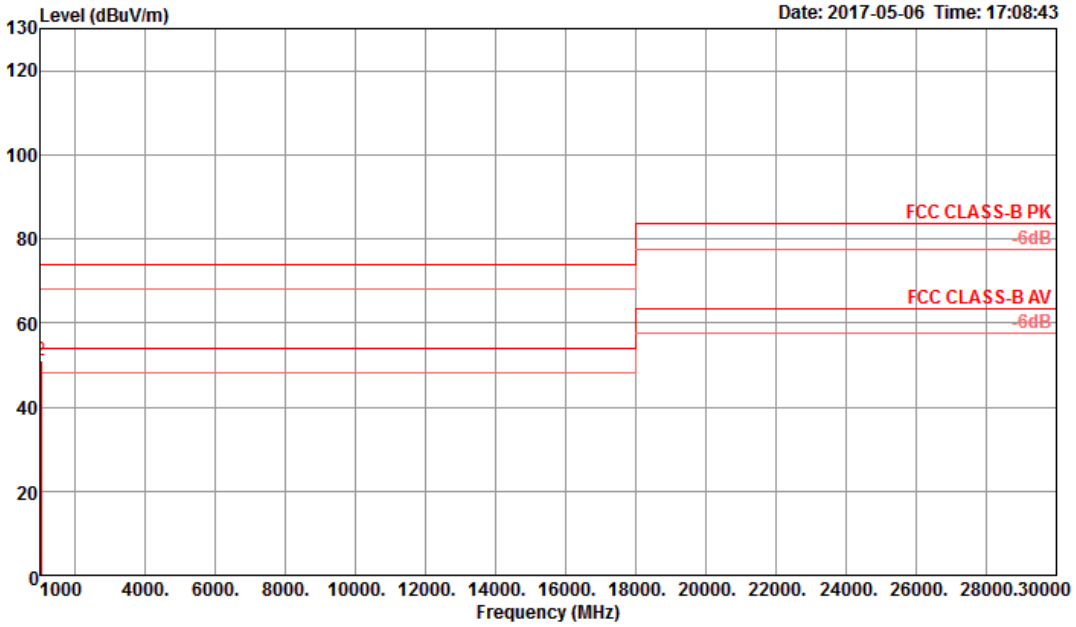
RSE below 1GHz Result			
Operating Mode	1	**Polarization**	Vertical
Operating Function	Unintentional - Normal Link		



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	56.19	35.84	40.00	-4.16	50.43	0.43	13.34	28.36	300	360	Peak	VERTICAL
2	99.84	32.68	43.50	-10.82	43.12	0.69	17.10	28.23	300	360	Peak	VERTICAL
3	149.31	30.34	43.50	-13.16	40.28	0.92	17.04	27.90	300	360	Peak	VERTICAL
4	168.71	25.46	43.50	-18.04	36.09	1.02	16.16	27.81	300	360	Peak	VERTICAL
5	200.72	24.39	43.50	-19.11	34.51	1.13	16.41	27.66	300	360	Peak	VERTICAL
6	275.41	25.57	46.00	-20.43	32.29	1.42	19.30	27.44	300	360	Peak	VERTICAL

Note 1: “>20dB” means emission levels that exceed the level of 20 dB below the applicable limit.
Note 2: “N/F” means Nothing Found emissions (No emissions were detected.)

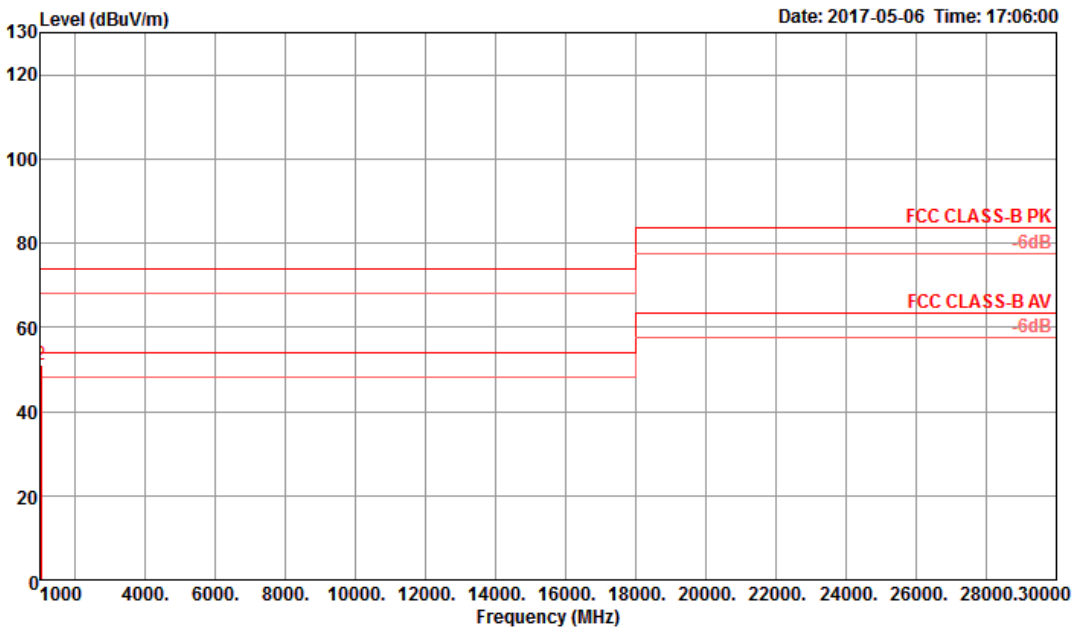
RSE Unintentional 1GHz~5th			
Operating Mode	1	**Polarization**	Horizontal
Operating Function	Unintentional - Normal Link		



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	1031.32	38.62	54.00	-15.38	48.13	2.43	23.84	35.78	123	141	Average	HORIZONTAL
2	1031.86	51.04	74.00	-22.96	60.54	2.43	23.84	35.77	123	141	Peak	HORIZONTAL

Note 1: “>20dB” means emission levels that exceed the level of 20 dB below the applicable limit.
Note 2: “N/F” means Nothing Found emissions (No emissions were detected.)

RSE Unintentional 1GHz~5th			
Operating Mode	1	**Polarization**	Vertical
Operating Function	Intentional - Normal Link		



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	1032.42	37.95	54.00	-16.05	47.45	2.43	23.84	35.77	134	215	Average	VERTICAL
2	1034.29	50.92	74.00	-23.08	60.41	2.43	23.85	35.77	134	215	Peak	VERTICAL

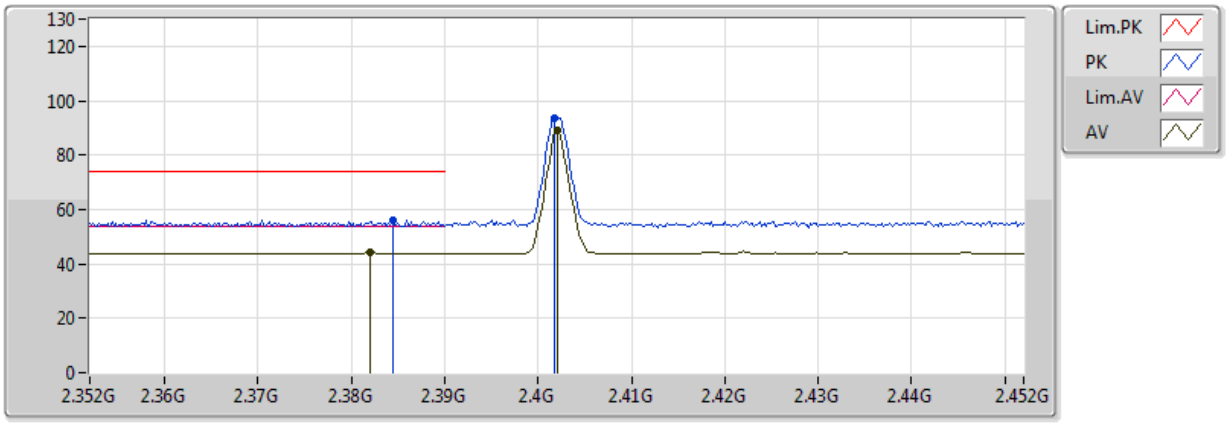
Note 1: “>20dB” means emission levels that exceed the level of 20 dB below the applicable limit.
Note 2: “N/F” means Nothing Found emissions (No emissions were detected.)

Summary

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Pol. (H/V)	Azimuth (°)	Height (m)	Comments
BT-LE_Nss1_1TX	-	-	-	-	-	-	-	-	-	-	-	-
2.4-2.4835GHz	Pass	AV	2.382G	50.59	54.00	-3.41	31.89	3	H	0	2.30	-

BT-LE_Nss1_1TX

2402MHz_TX

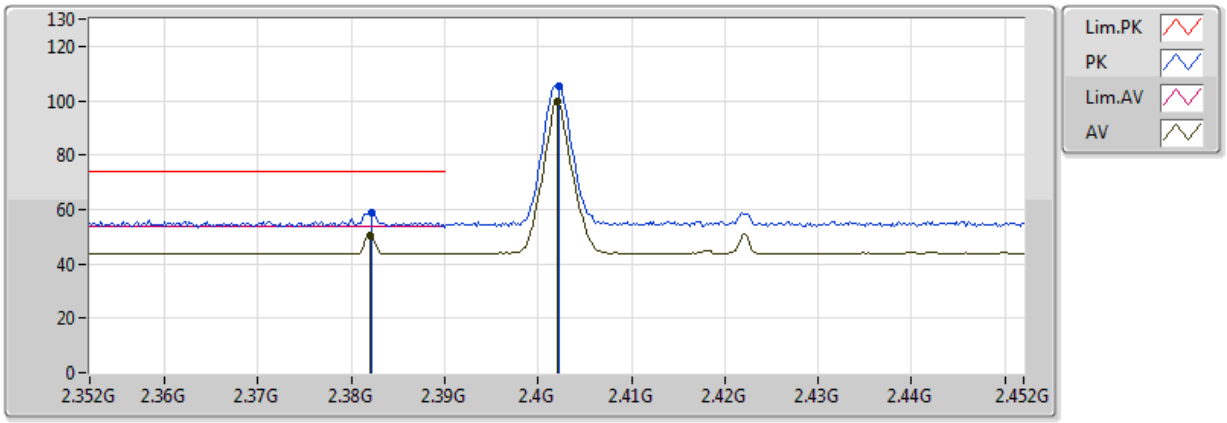


20170508
EUT Y_1TX
Setting Default
03-M-01
FSP(100019)

Type	Freq(Hz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Factor(dB)	Dist(m)	Pol.(H/V)	Azimuth(°)	Height(m)	Comments
AV	2.382G	44.41	54.00	-9.59	31.89	3	V	227	1.46	-
AV	2.402G	88.95	Inf	-Inf	31.94	3	V	227	1.46	-
PK	2.3844G	56.00	74.00	-18.00	31.90	3	V	227	1.46	-
PK	2.4018G	93.82	Inf	-Inf	31.94	3	V	227	1.46	-

BT-LE_Nss1_1TX

2402MHz_TX

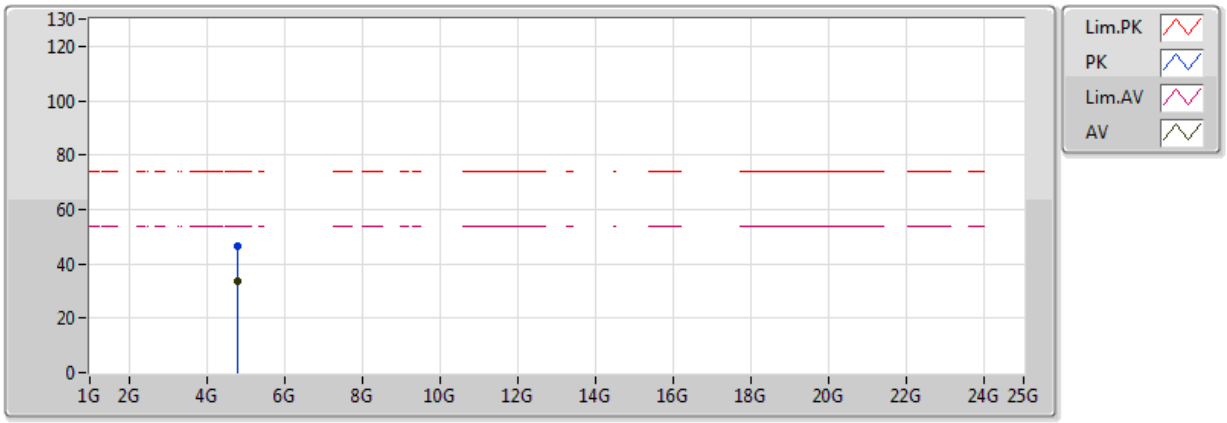


20170508
EUT Y_1TX
Setting Default
03-M-01
FSP(100019)

Type	Freq(Hz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Factor(dB)	Dist(m)	Pol.(H/V)	Azimuth(°)	Height(m)	Comments
AV	2.382G	50.59	54.00	-3.41	31.89	3	H	0	2.30	-
AV	2.402G	99.51	Inf	-Inf	31.94	3	H	0	2.30	-
PK	2.3822G	58.71	74.00	-15.29	31.89	3	H	0	2.30	-
PK	2.4022G	105.23	Inf	-Inf	31.95	3	H	0	2.30	-

BT-LE_Nss1_1TX

2402MHz_TX

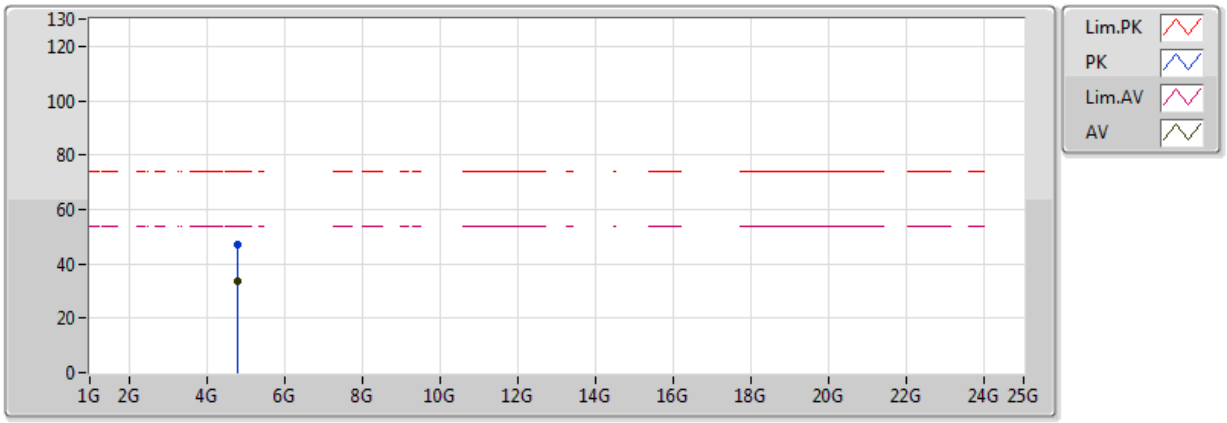


20170508
EUT Y_1TX
Setting Default
03-M-01
FSP(100019)

Type	Freq(Hz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Factor(dB)	Dist(m)	Pol.(H/V)	Azimuth(°)	Height(m)	Comments
AV	4.80778G	33.49	54.00	-20.51	4.69	3	V	158	1.16	-
PK	4.79962G	46.77	74.00	-27.23	4.67	3	V	158	1.16	-

BT-LE_Nss1_1TX

2402MHz_TX

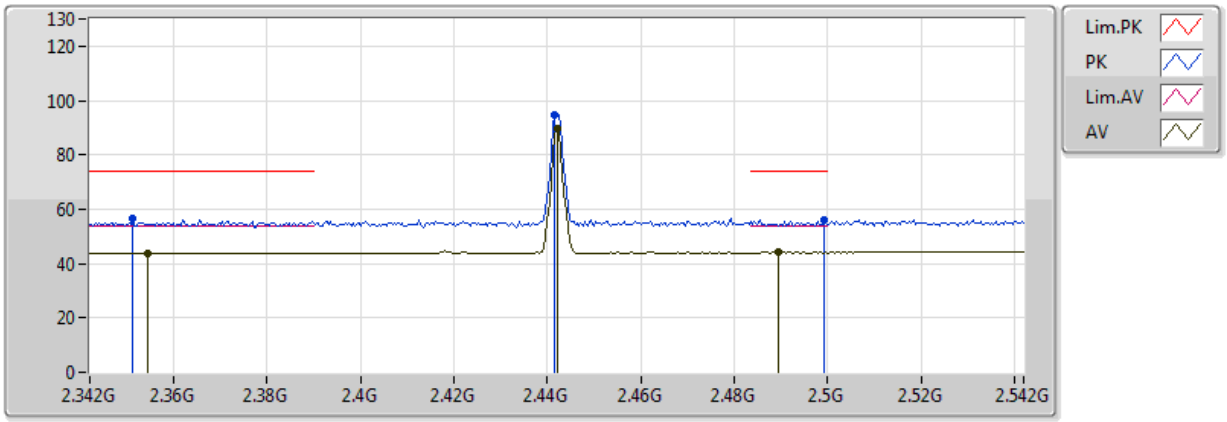


20170508
EUT Y_1TX
Setting Default
03-M-01
FSP(100019)

Type	Freq(Hz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Factor(dB)	Dist(m)	Pol.(H/V)	Azimuth(°)	Height(m)	Comments
AV	4.809G	33.59	54.00	-20.41	4.69	3	H	228	1.84	-
PK	4.80578G	47.12	74.00	-26.88	4.68	3	H	228	1.84	-

BT-LE_Nss1_1TX

2442MHz_TX

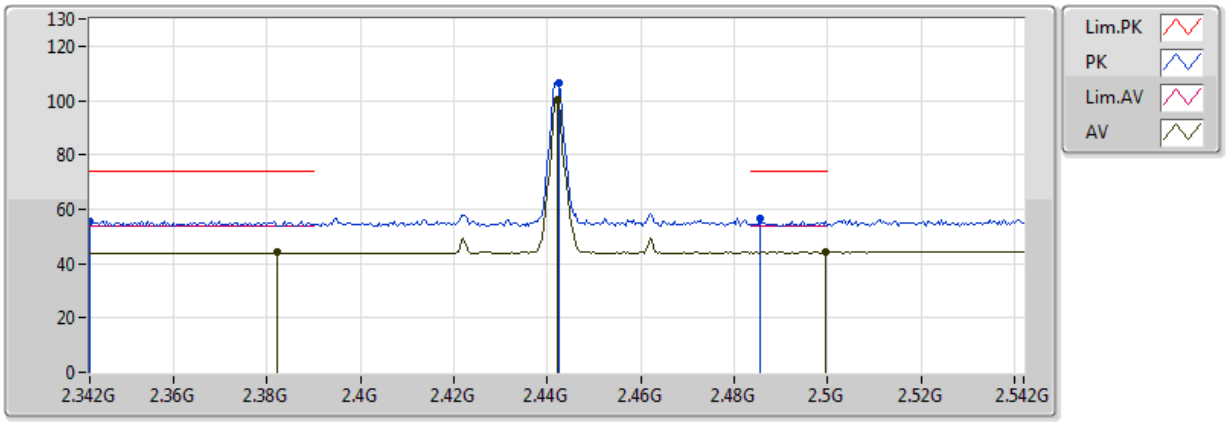


20170508
EUT Y_1TX
Setting Default
03-M-01
FSP(100019)

Type	Freq(Hz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Factor(dB)	Dist(m)	Pol.(H/V)	Azimuth(°)	Height(m)	Comments
AV	2.3544G	43.98	54.00	-10.02	31.82	3	V	357	1.07	-
AV	2.442G	89.39	Inf	-Inf	32.04	3	V	357	1.07	-
AV	2.4896G	44.10	54.00	-9.90	32.16	3	V	357	1.07	-
PK	2.3512G	56.67	74.00	-17.33	31.81	3	V	357	1.07	-
PK	2.4416G	94.47	Inf	-Inf	32.04	3	V	357	1.07	-
PK	2.4992G	56.16	74.00	-17.84	32.18	3	V	357	1.07	-

BT-LE_Nss1_1TX

2442MHz_TX

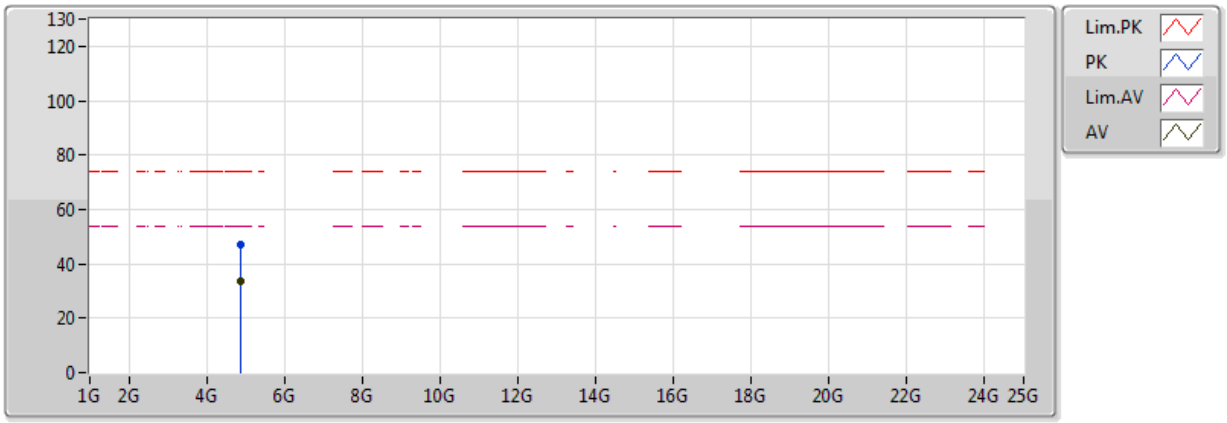


20170508
EUT Y_1TX
Setting Default
03-M-01
FSP(100019)

Type	Freq(Hz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Factor(dB)	Dist(m)	Pol.(H/V)	Azimuth(°)	Height(m)	Comments
AV	2.382G	44.02	54.00	-9.98	31.89	3	H	0	1.18	-
AV	2.442G	100.55	Inf	-Inf	32.04	3	H	0	1.18	-
AV	2.4996G	44.19	54.00	-9.81	32.18	3	H	0	1.18	-
PK	2.342G	55.71	74.00	-18.29	31.79	3	H	0	1.18	-
PK	2.4424G	106.30	Inf	-Inf	32.04	3	H	0	1.18	-
PK	2.4856G	56.55	74.00	-17.45	32.15	3	H	0	1.18	-

BT-LE_Nss1_1TX

2442MHz_TX

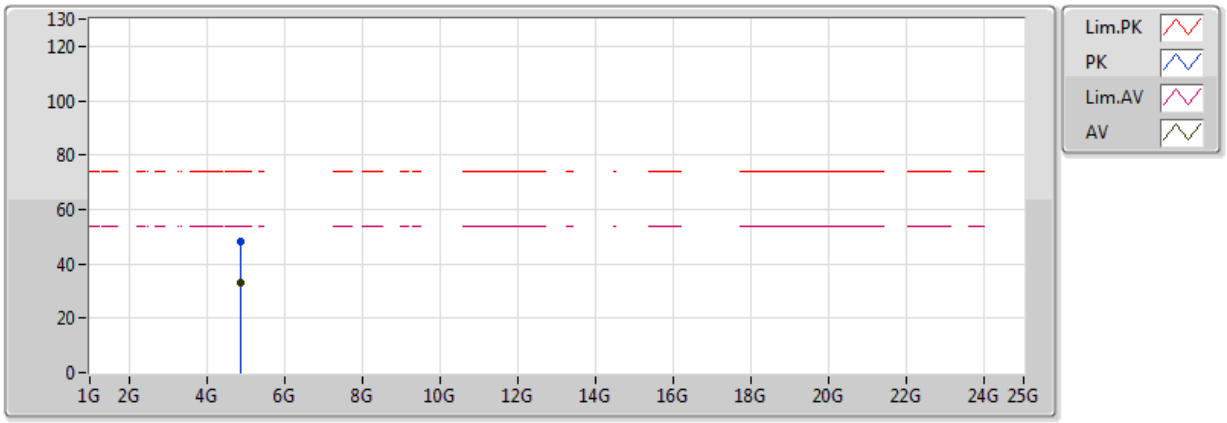


20170508
EUT Y_1TX
Setting Default
03-M-01
FSP(100019)

Type	Freq(Hz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Factor(dB)	Dist(m)	Pol.(H/V)	Azimuth(°)	Height(m)	Comments
AV	4.88706G	33.41	54.00	-20.59	4.84	3	V	122	2.27	-
PK	4.88522G	47.01	74.00	-26.99	4.84	3	V	122	2.27	-

BT-LE_Nss1_1TX

2442MHz_TX

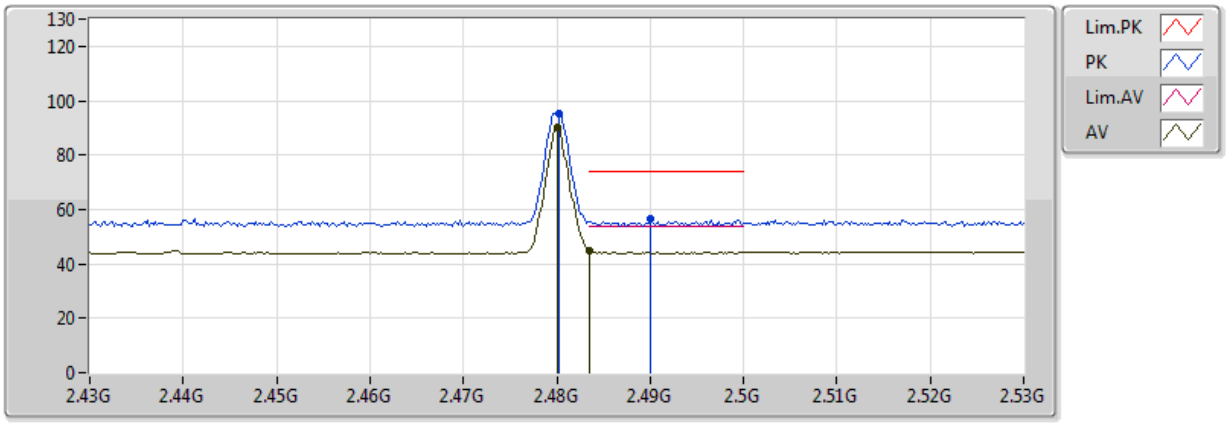


20170508
EUT Y_1TX
Setting Default
03-M-01
FSP(100019)

Type	Freq(Hz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Factor(dB)	Dist(m)	Pol.(H/V)	Azimuth(°)	Height(m)	Comments
AV	4.88716G	33.33	54.00	-20.67	4.84	3	H	75	1.22	-
PK	4.88412G	48.07	74.00	-25.93	4.84	3	H	75	1.22	-

BT-LE_Nss1_1TX

2480MHz_TX

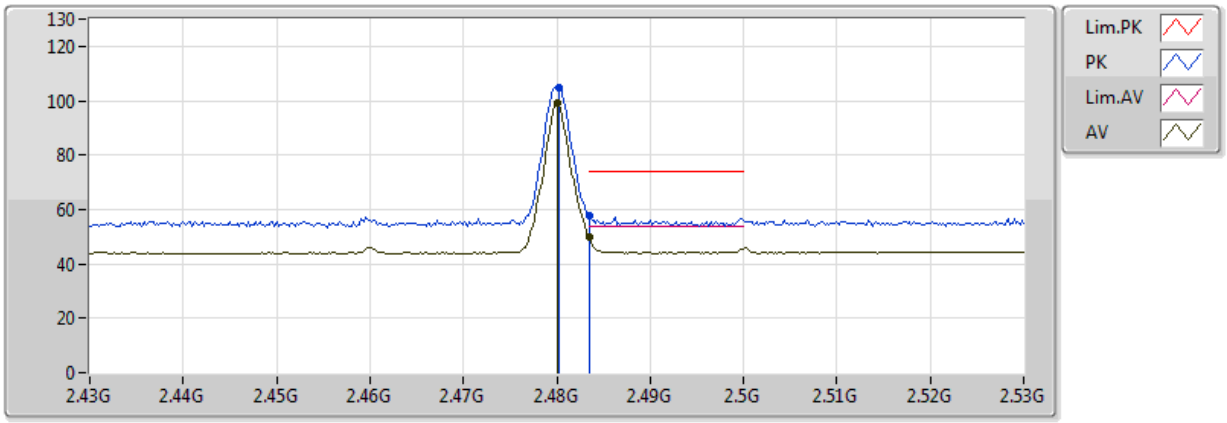


20170508
EUT Y_1TX
Setting Default
03-M-01
FSP(100019)

Type	Freq(Hz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Factor(dB)	Dist(m)	Pol.(H/V)	Azimuth(°)	Height(m)	Comments
AV	2.48G	90.49	Inf	-Inf	32.13	3	V	1	1.01	-
AV	2.483502G	44.98	54.00	-9.02	32.14	3	V	1	1.01	-
PK	2.4802G	95.44	Inf	-Inf	32.13	3	V	1	1.01	-
PK	2.49G	56.84	74.00	-17.16	32.16	3	V	1	1.01	-

BT-LE_Nss1_1TX

2480MHz_TX

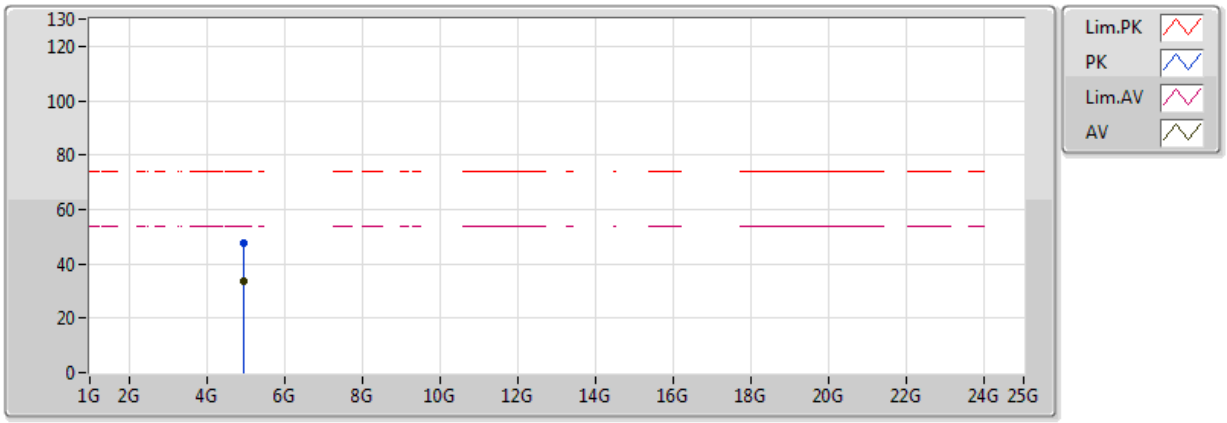


20170508
EUT Y_1TX
Setting Default
03-M-01
FSP(100019)

Type	Freq(Hz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Factor(dB)	Dist(m)	Pol.(H/V)	Azimuth(°)	Height(m)	Comments
AV	2.48G	99.07	Inf	-Inf	32.13	3	H	1	1.11	-
AV	2.483502G	49.95	54.00	-4.05	32.14	3	H	1	1.11	-
PK	2.4802G	104.75	Inf	-Inf	32.13	3	H	1	1.11	-
PK	2.483502G	57.67	74.00	-16.33	32.14	3	H	1	1.11	-

BT-LE_Nss1_1TX

2480MHz_TX

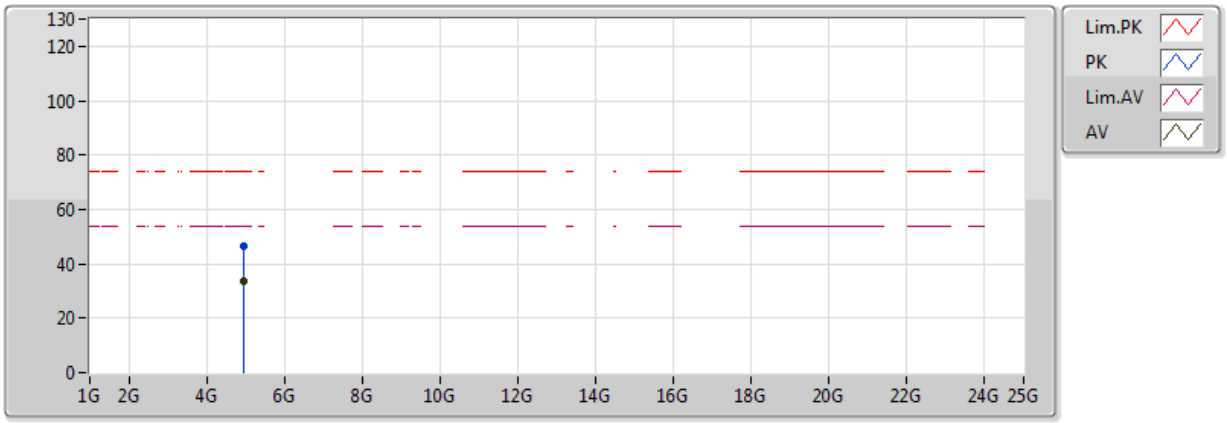


20170508
EUT Y_1TX
Setting Default
03-M-01
FSP(100019)

Type	Freq(Hz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Factor(dB)	Dist(m)	Pol.(H/V)	Azimuth(°)	Height(m)	Comments
AV	4.9641G	33.50	54.00	-20.50	5.01	3	V	302	1.57	-
PK	4.96118G	47.37	74.00	-26.63	5.00	3	V	302	1.57	-

BT-LE_Nss1_1TX

2480MHz_TX



20170508
EUT Y_1TX
Setting Default
03-M-01
FSP(100019)

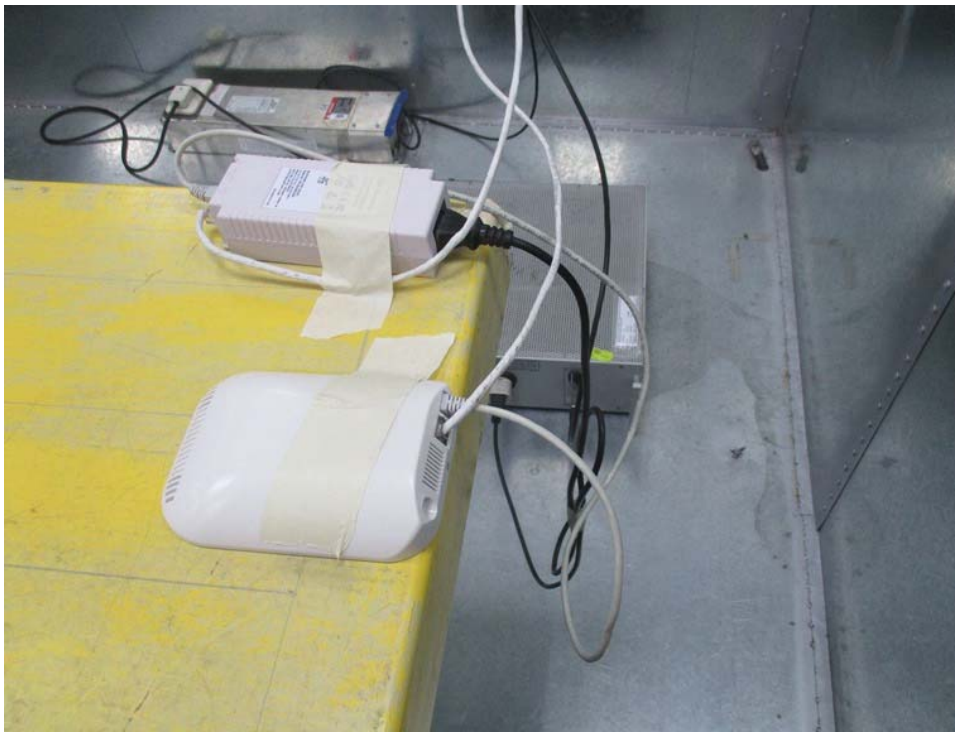
Type	Freq(Hz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Factor(dB)	Dist(m)	Pol.(H/V)	Azimuth(°)	Height(m)	Comments
AV	4.96378G	33.41	54.00	-20.59	5.01	3	H	95	2.13	-
PK	4.95828G	46.59	74.00	-27.41	5.00	3	H	95	2.13	-

1. Photographs of Conducted Emissions Test Configuration

Test Mode: Mode 8 / Test configuration: Intentional - CTX

FRONT VIEW

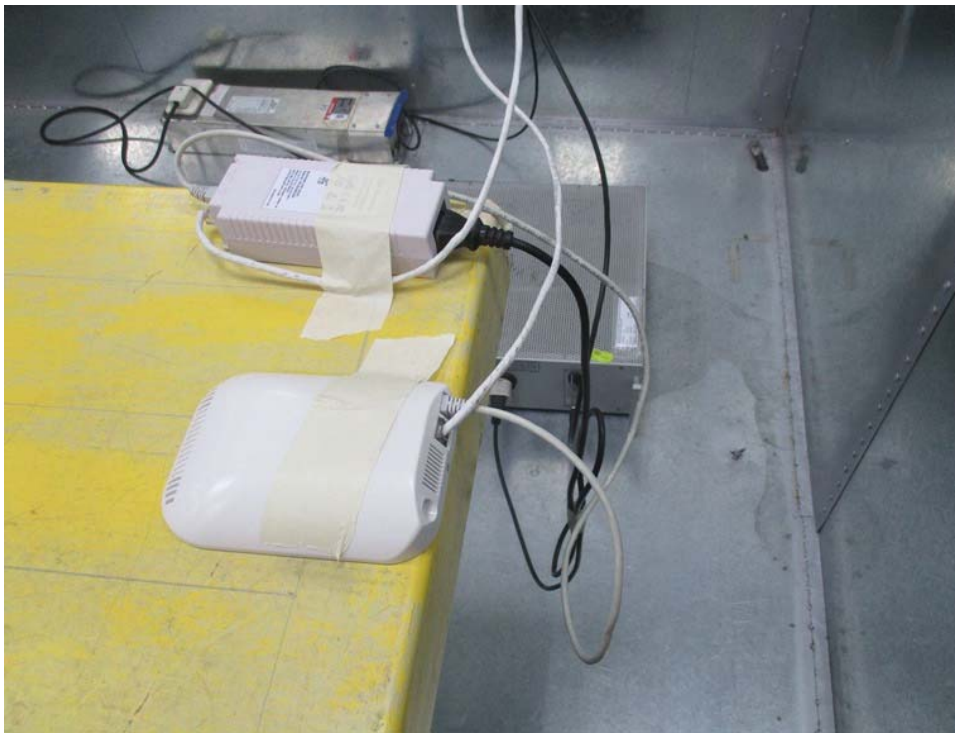
REAR VIEW



Test Mode: Mode 2 / Test configuration: Unintentional - Normal Link

FRONT VIEW

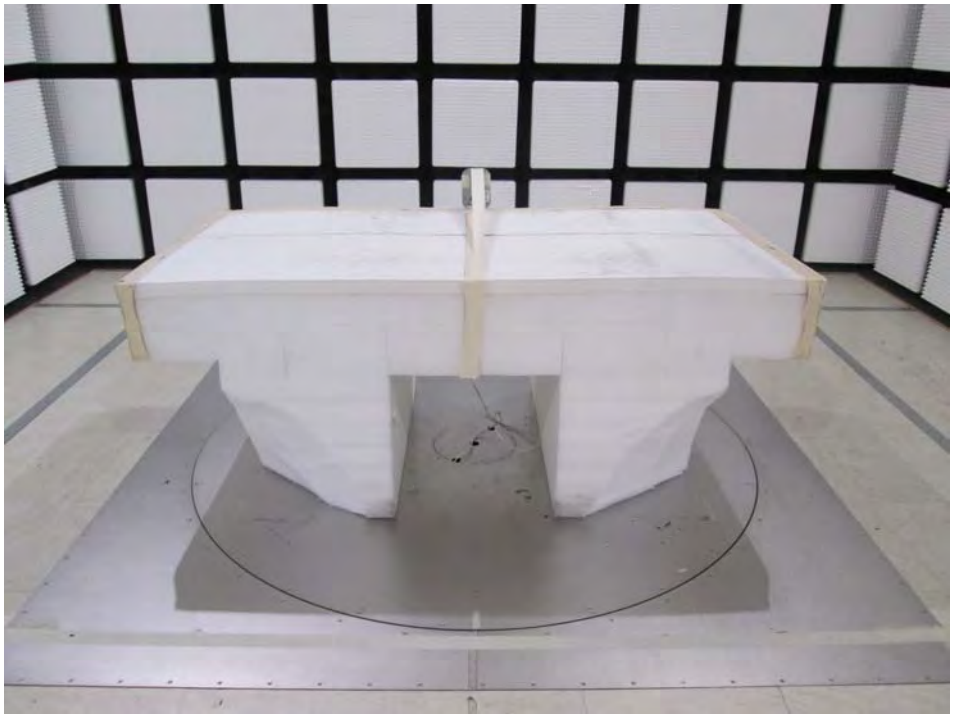
REAR VIEW



2. Photographs of Radiated Emissions Test Configuration

Test Configuration: 30MHz~1GHz / Test Mode: Mode 2 / Intentional - CTX

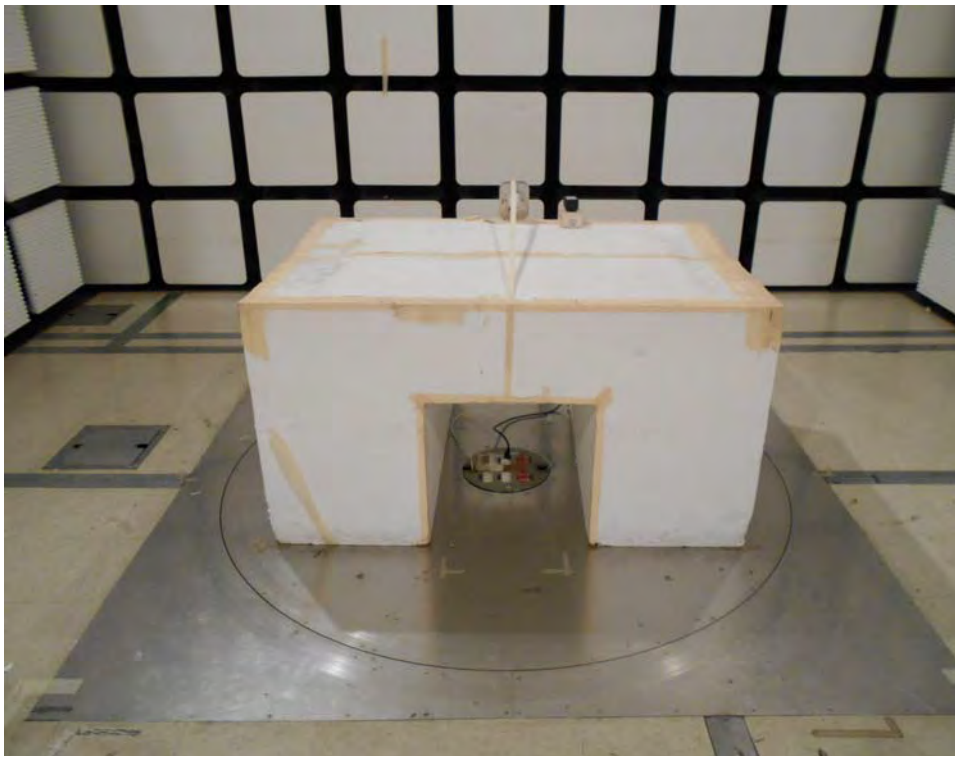
FRONT VIEW



REAR VIEW

Test Configuration: 30MHz~1GHz / Test Mode: Mode 1 / Unintentional - Normal Link

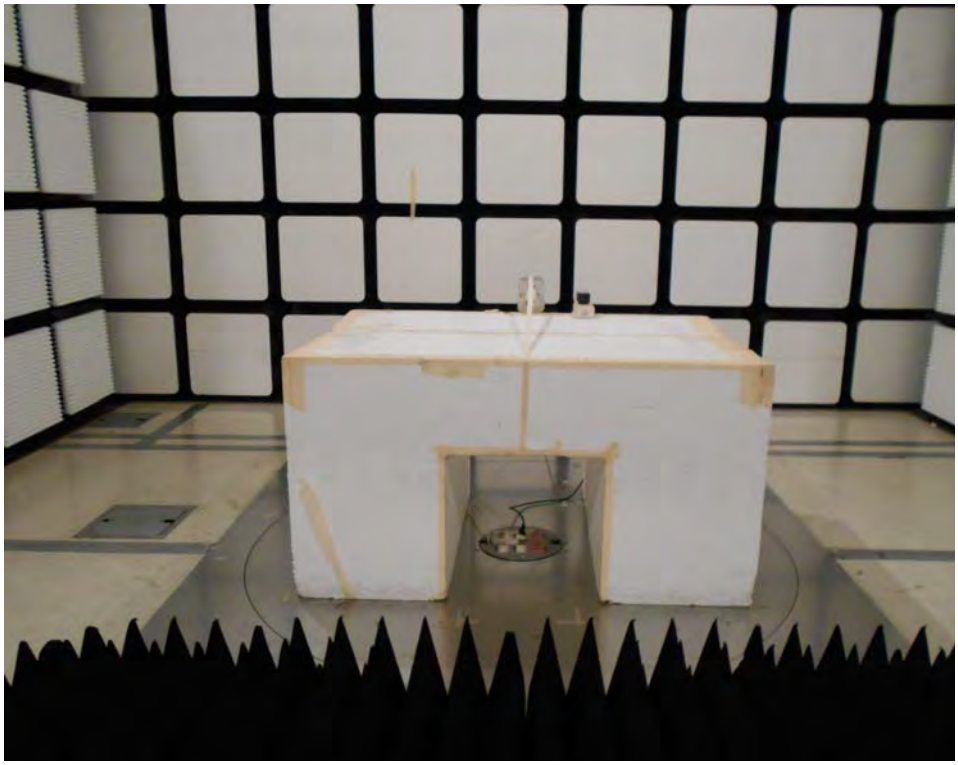
FRONT VIEW



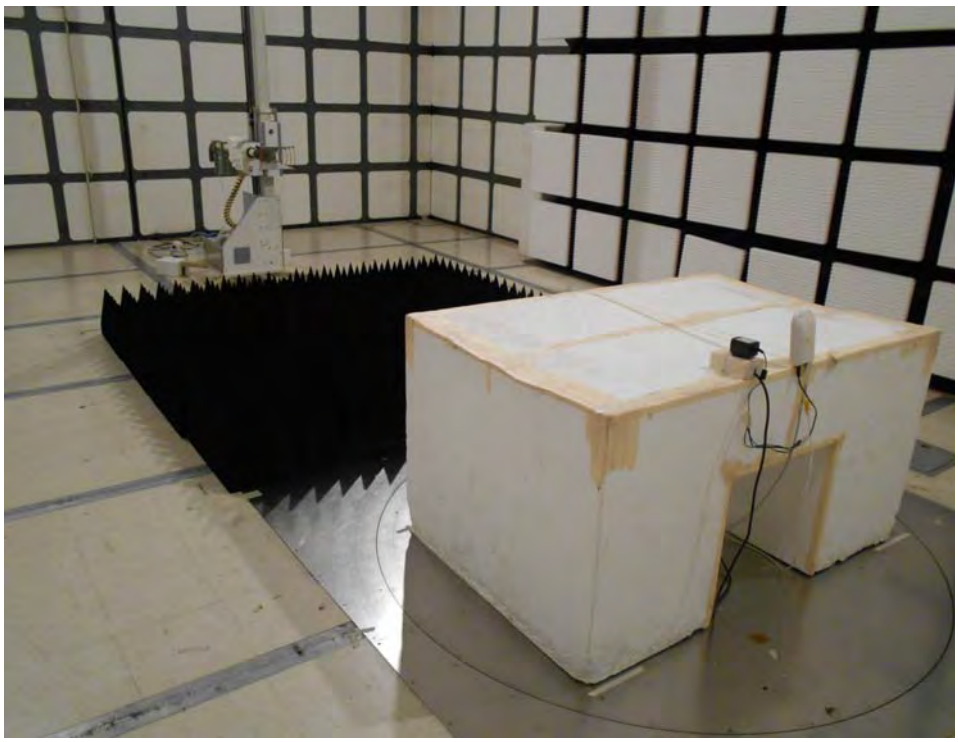
REAR VIEW

Test Configuration: Above 1GHz / Unintentional 1GHz~5th

FRONT VIEW

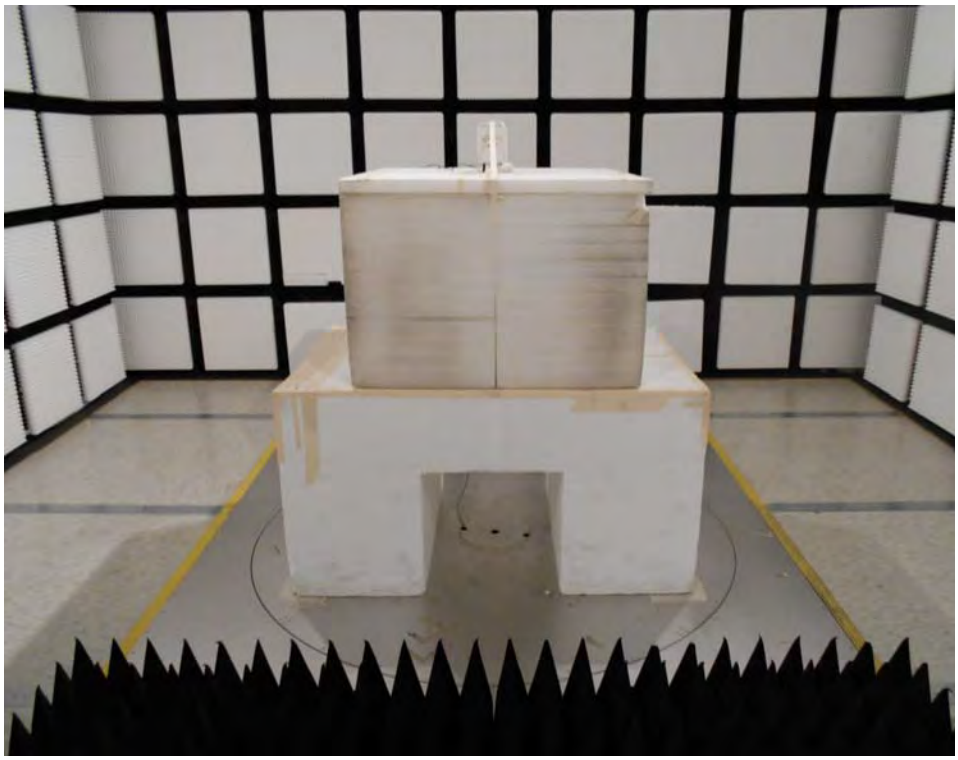
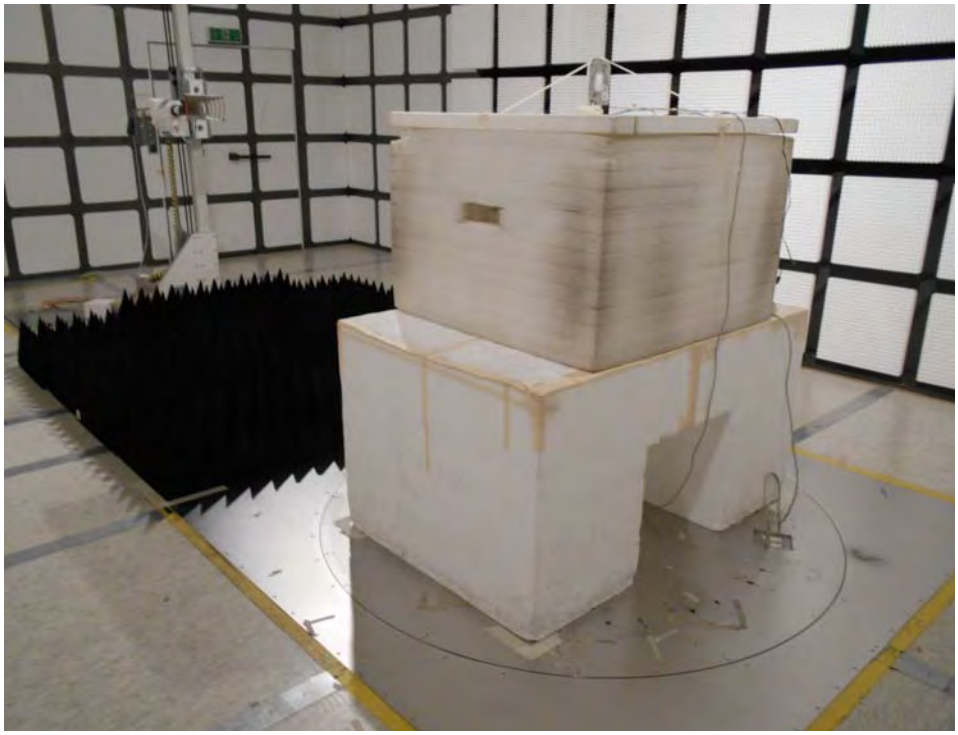


REAR VIEW



Test Configuration: Above 1GHz / Intentional 1GHz~10th

FRONT VIEW



REAR VIEW