



Radio Test Report

Equipment : 802.11a/b/g/n/ac RTL8821CE Combo module
Brand Name : REALTEK
Model No. : RTL8821CE
FCC ID : TX2-RTL8821CE
Standard : 47 CFR FCC Part 15.247
(Modified to account for the Chile's allocation of 2400 ~ 2483.5MHz)
Operating Band : 2400 MHz – 2483.5 MHz
Applicant : Realtek Semiconductor Corp.
No. 2, Innovation Road II, Hsinchu Science Park,
Hsinchu 300, Taiwan
Manufacturer : Realtek Semiconductor Corp.
No. 2, Innovation Road II, Hsinchu Science Park,
Hsinchu 300, Taiwan

The product sample received on Sep. 30, 2016 and completely tested on Nov. 29, 2016. We, SPORTON, would like to declare that the tested sample has been evaluated in accordance with the procedures given inanes and shown compliance with the applicable technical standards.
(Modified to account for the Chile's allocation of 2400 ~ 2483.5MHz)

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.

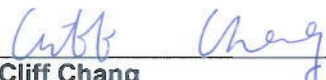

Cliff Chang
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Summary of Test Result

Conformance Test Specifications (Modified to account for the Chile's allocation of 2400 ~ 2483.5MHz)				
Report Clause	Ref. Std. Clause	Description	Limit	Result
1.1.2	15.203	Antenna Requirement	FCC 15.203	Complied
3.1	15.207	AC Power-line Conducted Emissions	FCC 15.207	Complied
3.2	15.247(a)	20dB Bandwidth	15.247(a)	Complied
3.2	15.247(a)	Carrier Frequency Separation	15.247(a)	Complied
3.3	15.247(b)	Maximum EIRP Output Power	15.247(b)	Complied
3.4	15.247(a)	Number of Hopping Frequencies and Hopping Band edge	15.247(a)	Complied
3.5	15.247(a)	Time of Occupancy (Dwell Time)	15.247(a)	Complied
3.6	15.247(d)	Emissions in Non-restricted Frequency Bands	15.247(d)	Complied
3.7	15.247(d)	Emissions in Restricted Frequency Bands	Restricted Bands: FCC 15.209	Complied



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FCC ID: TX2-RTL8821CE

1 General Description

1.1 Information

1.1.1 RF General Information

Frequency Range (MHz)	Bluetooth Version	Ch. Frequency (MHz)	Channel Number
2400-2483.5	BR / EDR	2402-2480	0-78 [79]

Band	Mode	BWch (MHz)	Nant
2.4G	BT-EDR	1	1
2.4G	BT-EDR2	1	1
2.4G	BT-EDR3	1	1

Note:

- ♦ 2.4G is the 2.4GHz Band (2.4-2.4835GHz).
- ♦ Bluetooth BR uses a GFSK (1Mbps).
- ♦ Bluetooth EDR uses a combination of $\pi/4$ -DQPSK (2Mbps) and 8DPSK (3Mbps).
- ♦ Bluetooth BR/EDR uses as a system using FHSS modulation.
- ♦ 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	Model Name	Antenna Type	Connector	Gain (dBi)	
					2.4GHz	5GHz
1	LYNwave	ALA110-222050-300011	PIFA Antenna	IPEX MHF4	3.5	5
2	PSA	RFDPA171320EMLB301	Dipole Antenna	IPEX MHF4	3.14	5

Note: 1. The EUT has two types of antenna and there are above only records higher gain of same type antenna.

2. For more information, refer to Appendix J. Antenna List.

3. There are four configurations for EUT.

4. Chain 1: Connect to Ant. 1 or Ant. 2, Chain 2: Connect to Ant. 1 or Ant. 2

EUT	Configuration	Antenna Chain	Description
EUT 1	Config.1 Diversity	2 chains	The EUT supports the antenna with TX/RX diversity function for WLAN and Bluetooth. (Ex. Assume chain 1 was selected to conduct transmitting function in WLAN, so chain 2 was selected in Bluetooth Mode. Vice versa.) WLAN 2.4GHz and Bluetooth will be transmitting from the different chains; WLAN 5GHz and Bluetooth will be transmitting from the same chain. WLAN function (1TX, 1RX) / Bluetooth function (1TX, 1RX) The EUT supports 1TX/1RX function, and it supports TX/RX diversity function. Both chain 1 and chain 2 could be used as transmitting/receiving antenna, but only one of them could transmit/receive at the same time.
EUT 2	Config.2 Fixed	2 chains	WLAN function (1TX, 1RX) / Bluetooth function (1TX, 1RX) Chain 2 is designated for WLAN (2.4GHz), Chain 1 is designated for WLAN (5GHz) and Bluetooth.
EUT 3	Config.3 Single	1 chain	WLAN function (1TX, 1RX) / Bluetooth function (1TX, 1RX) WLAN and BT share a common chain, where WLAN (2.4GHz) and BT couldn't transmit/receive at the same time, but WLAN (5GHz) and BT could transmit/receive at the same time.
EUT 4	Config.4 Single	1 chain	WLAN function (1TX, 1RX) / Bluetooth function (1TX, 1RX) WLAN and BT share a common chain, where WLAN (2.4GHz) and BT couldn't transmit/receive at the same time, but WLAN (5GHz) and BT could transmit/receive at the same time.

Note 1: After evaluating, EUT 1 has been evaluated to be the worst case, so it was performed for all tests.

For WLAN 2.4GHz function:

Chain 2 generated the worst case in configuration 1, so it was selected to test and record in the report.

For WLAN 5GHz and Bluetooth function:

Chain 1 generated the worst case in configuration 1, so it was selected to test and record in the report.

1.1.3 Mode Test Duty Cycle

Mode	DC	T(s)
BT-EDR	1	n/a (DC>=0.98)
BT-EDR2	1	n/a (DC>=0.98)
BT-EDR3	1	n/a (DC>=0.98)

1.1.4 EUT Operational Condition

EUT Power Type	From host system
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1.2 Testing Applied Standards

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

- ♦ 47 CFR FCC Part 15
- ♦ FCC Public Notice DA 00-705

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 (Others test)	TH01-CB	Eddie Weng	24°C / 58%	Nov. 15, 2016 Nov. 23 2016
RF Conducted (Maximum EIRP Output Power)	TH01-CB	Gary Chu	24°C / 58%	Nov. 28 2016
Radiated	03CH01-CB	Lucke Hsieh, Paul Chen	22°C / 54%	Oct. 20, 2016 Nov. 29, 2016
AC Conduction	CO01-CB	Kane Liu	23°C / 60%	Oct. 15, 2016

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%

2 Test Configuration of EUT

2.1 Test Channel Mode

For BR (GFSK) 1 Mbps:

Test Software Version	Bluetooth MP Tool		
Frequency	2402 MHz	2441 MHz	2480 MHz
Power Parameters	default	default	default

For EDR ($\pi/4$ -DQPSK) 2 Mbps:

Test Software Version	Bluetooth MP Tool		
Frequency	2402 MHz	2441 MHz	2480 MHz
Power Parameters	default	default	default

For EDR (8DPSK) 3 Mbps:

Test Software Version	Bluetooth MP Tool		
Frequency	2402 MHz	2441 MHz	2480 MHz
Power Parameters	default	default	default

Note:

- ♦ Test range channel consist of L (Low Ch.), M (Middle Ch.), H (High Ch.), S (Single Ch.) and C (Straddle Band Ch.).

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	Normal Link
1	EUT 1 with Ant. 1 (wireless 2.4GHz + Bluetooth 4.2)
2	EUT 1 with Ant. 1 (wireless 5GHz + Bluetooth 4.2)
Mode 1 has been evaluated to be the worst case between Mode 1~2, thus measurement for Mode 3 will follow this same test mode.	
3	EUT 1 with Ant. 2 (wireless 2.4GHz + Bluetooth 4.2)
For operating mode 1 is the worst case and it was record in this test report.	

The Worst Case Mode for Following Conformance Tests	
Tests Item	20dB Bandwidth Carrier Frequency Separation Maximum EIRP Output Power Number of Hopping Frequencies Hopping Bandedge Time of Occupancy (Dwell Time) Emissions in Non-restricted Frequency Bands
Test Condition	Conducted measurement at transmit chains
Test Mode	1 EUT 1 with Ant. 1

Note: For Conducted measurement Test: only the higher gain antenna "Ant. 1" was selected to perform the test and recorded in this report.

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	Normal Link
1	EUT 1 Y axis with Ant. 1 (wireless 2.4GHz + Bluetooth 4.2)
2	EUT 1 Y axis with Ant. 1 (wireless 5GHz + Bluetooth 4.2)
Mode 1 has been evaluated to be the worst case between Mode 1~2, thus measurement for Mode 3 will follow this same test mode.	
3	EUT 1 Z axis with Ant. 1 (wireless 2.4GHz + Bluetooth 4.2)
Mode 3 has been evaluated to be the worst case between Mode 1~3, thus measurement for Mode 4 will follow this same test mode.	
4	EUT 1 Z axis with Ant. 2 (wireless 2.4GHz + Bluetooth 4.2)
For operating mode 3 is the worst case and it was record in this test report.	
Operating Mode > 1GHz	CTX
The EUT was performed at X axis, Y axis and Z axis position for Radiated emission test, and the worst case was found at X axis. So the measurement will follow this same test configuration.	
1	EUT 1 X axis with Ant. 1
2	EUT 1 X axis with Ant. 2

The Worst Case Mode for Following Conformance Tests	
Tests Item	Simultaneous Transmission Analysis
Test Condition	Radiated measurement
Operating Mode	Normal Link
1	EUT 1 X axis with Ant. 1 (wireless 2.4GHz + Bluetooth 4.2)
2	EUT 1 Y axis with Ant. 1 (wireless 2.4GHz + Bluetooth 4.2)
3	EUT 1 Z axis with Ant. 1 (wireless 2.4GHz + Bluetooth 4.2)
4	EUT 1 X axis with Ant. 1 (wireless 5GHz + Bluetooth 4.2)
5	EUT 1 Y axis with Ant. 1 (wireless 5GHz + Bluetooth 4.2)
6	EUT 1 Z axis with Ant. 1 (wireless 5GHz + Bluetooth 4.2)
7	EUT 1 X axis with Ant. 2 (wireless 2.4GHz + Bluetooth 4.2)
8	EUT 1 Y axis with Ant. 2 (wireless 2.4GHz + Bluetooth 4.2)
9	EUT 1 Z axis with Ant. 2 (wireless 2.4GHz + Bluetooth 4.2)
10	EUT 1 X axis with Ant. 2 (wireless 5GHz + Bluetooth 4.2)
11	EUT 1 Y axis with Ant. 2 (wireless 5GHz + Bluetooth 4.2)
12	EUT 1 Z axis with Ant. 2 (wireless 5GHz + Bluetooth 4.2)
Mode 3 has been evaluated to be the worst case between Mode 1~3, thus measurement for Mode 13 will follow this same test mode.	
13	EUT 4 Z axis with Ant. 1 (wireless 2.4GHz + Bluetooth 4.2)
Mode 6 has been evaluated to be the worst case between Mode 4~6, thus measurement for Mode 14 will follow this same test mode.	
14	EUT 4 Z axis with Ant. 1 (wireless 5GHz + Bluetooth 4.2)
Mode 9 has been evaluated to be the worst case between Mode 7~9, thus measurement for Mode 15 will follow this same test mode.	
15	EUT 4 Z axis with Ant. 2 (wireless 2.4GHz + Bluetooth 4.2)
Mode 12 has been evaluated to be the worst case between Mode 10~12, thus measurement for Mode 16 will follow this same test mode.	
16	EUT 4 Z axis with Ant. 2 (wireless 5GHz + Bluetooth 4.2)
Mode 3 has been evaluated to be the worst case between Mode 1~3, thus measurement for Mode 17 will follow this same test mode.	
17	EUT 3 Z axis with Ant. 1 (wireless 2.4GHz + Bluetooth 4.2)
Mode 6 has been evaluated to be the worst case between Mode 4~6, thus measurement for Mode 18 will follow this same test mode.	
18	EUT 3 Z axis with Ant. 1 (wireless 5GHz + Bluetooth 4.2)
Mode 9 has been evaluated to be the worst case between Mode 7~9, thus measurement for Mode 19 will follow this same test mode.	
19	EUT 3 Z axis with Ant. 2 (wireless 2.4GHz + Bluetooth 4.2)
Mode 12 has been evaluated to be the worst case between Mode 10~12, thus measurement for Mode 20 will follow this same test mode.	



20	EUT 3 Z axis with Ant. 2 (wireless 5GHz + Bluetooth 4.2)
Mode 18 and Mode 19 are worst test result among Mode 1 ~ Mode 20, and the test result of those two modes are selected to record in the test report. Refer to Sporton Test Report No.: FA692918-03 for Co-location RF Exposure Evaluation and Appendix H for Radiated Emission Co-location.	

2.3 EUT Operation during Test

For CTX Mode:

The EUT was programmed to be in continuously transmitting mode.

For Normal Link:

During the test, the EUT operation to normal function.

2.4 Accessories

N/A

2.5 Support Equipment

For Test Site No: CO01-CB

Support Equipment				
No.	Equipment	Brand Name	Model Name	FCC ID
1	NB*2	DELL	E6430	DoC
2	Earphone	SHYARO CHI	MIC-04	DoC
3	Mouse	HP	FM100	DoC
4	Test fixture*2	REALTEK	N/A	N/A
5	AP Router	Planex	GW-AP54SGX	KA220030603014-1
6	Device	REALTEK	RTL8821CE	TX2-RTL8821CE

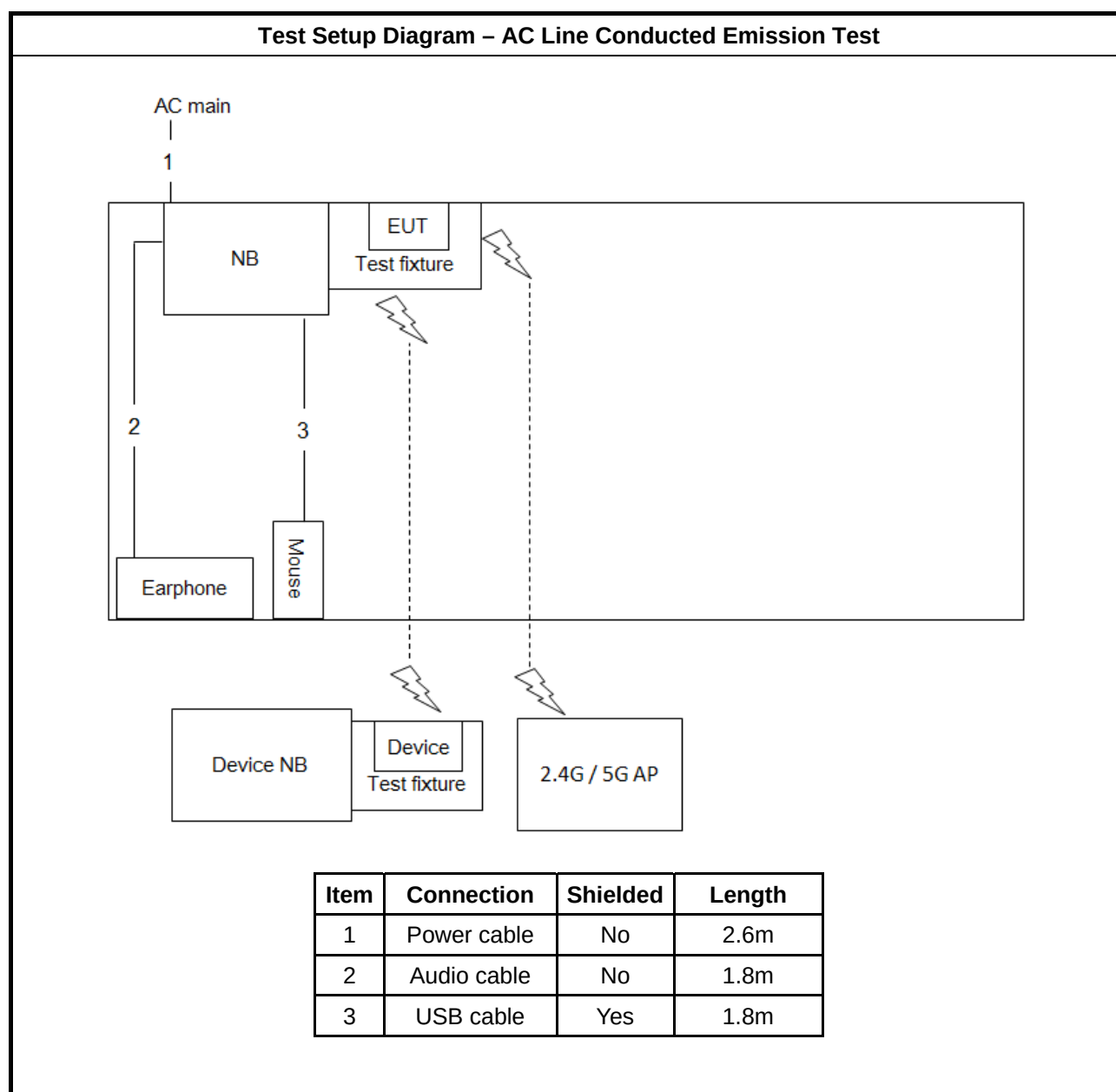
For Test Site No: 03CH01-CB (below 1GHz)

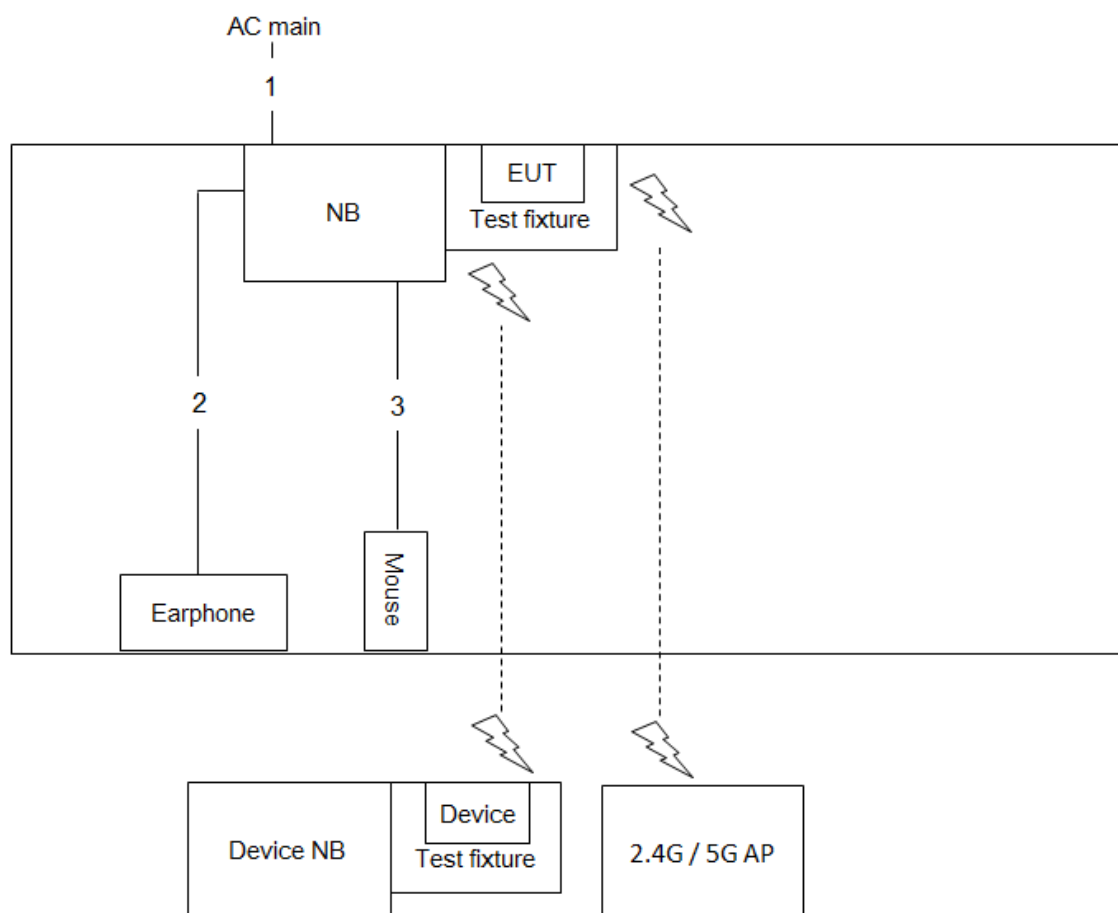
Support Equipment				
No.	Equipment	Brand Name	Model Name	FCC ID
1	NB*2	DELL	E4300	DoC
2	Mouse	Logitech	M-U0026	DoC
3	Earphone	SHYARO CHI	MIC-04	N/A
4	Test fixture*2	REALTEK	N/A	N/A
5	WLAN AP	D-LINK	DIR860L	KA2IR860LA1
6	Device	REALTEK	RTL8821CE	TX2-RTL8821CE

For Test Site No: 03CH01-CB (above 1GHz) and TH01-CB

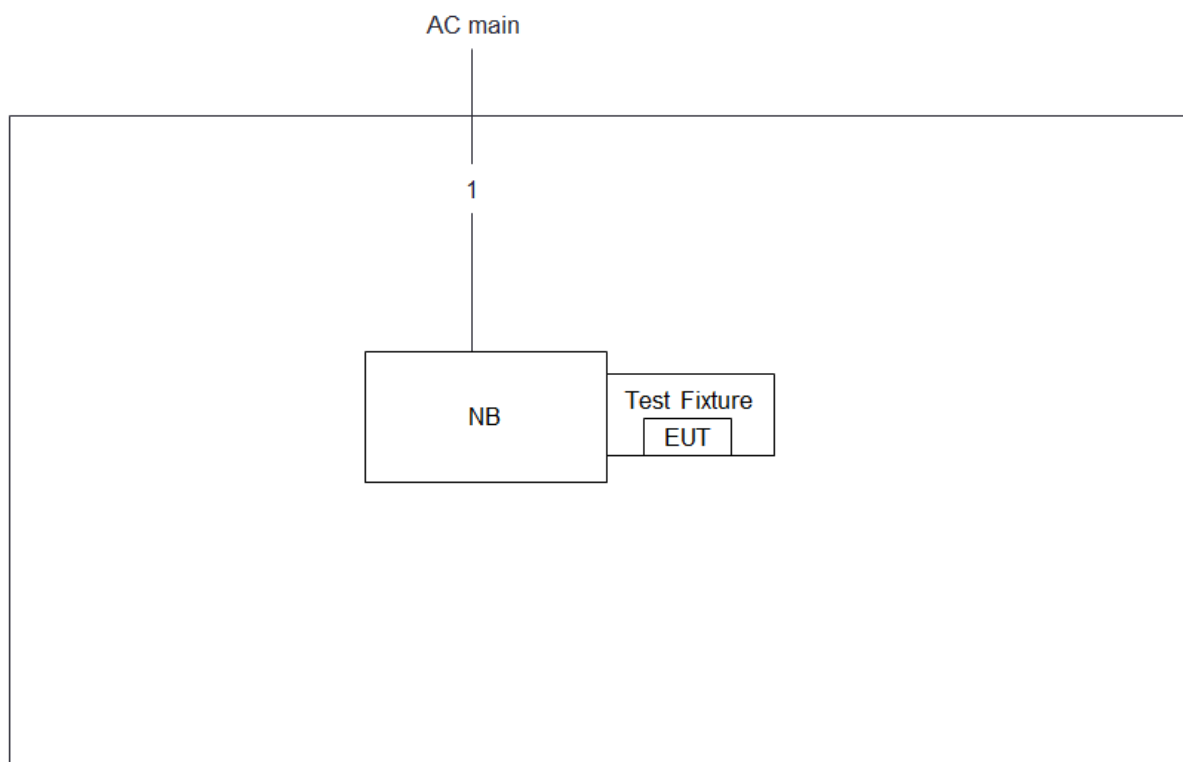
Support Equipment				
No.	Equipment	Brand Name	Model Name	FCC ID
1	NB	DELL	E4300	DoC
2	Test fixture	REALTEK	N/A	N/A

2.6 Test Setup Diagram





Item	Connection	Shielded	Length
1	Power cable	No	2.6m
2	Audio cable	No	1.1m
3	USB cable	Yes	1.8m

Test Setup Diagram - Radiated Test > 1GHz


Item	Connection	Shielded	Length
1	Power 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.

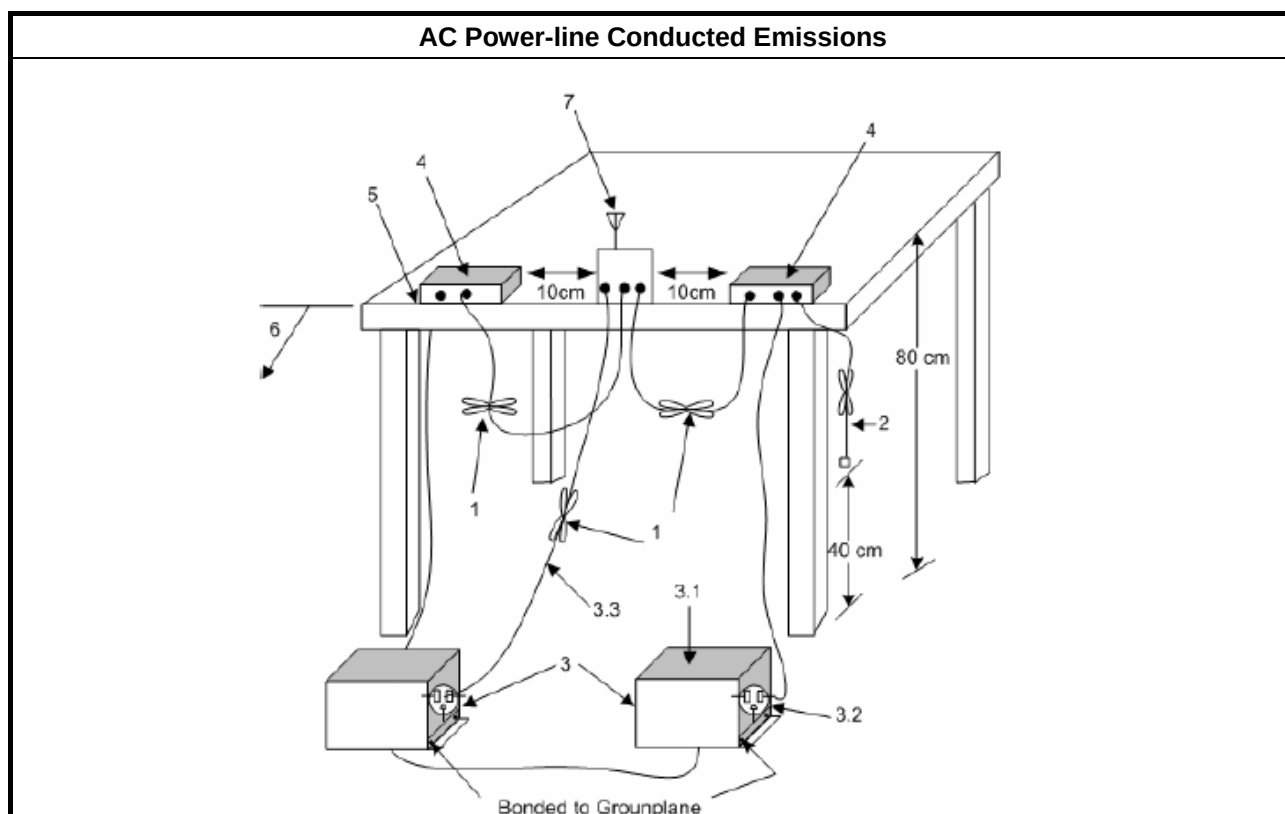
3.1.2 Measuring Instruments

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 foray power-line conducted emissions.

3.1.4 Test Setup





3.1.5 Test Result of AC Power-line Conducted Emissions

Refer as Appendix A

3.2 20dB Bandwidth and Carrier Frequency Separation

3.2.1 20dB Bandwidth and Carrier Frequency Separation Limit

20dB Bandwidth and Carrier Frequency Separation Limit for Frequency Hopping Systems	
▪ 902-928 MHz Band:	
	▪ $N \geq 50$ and $ChS \geq \text{MAX}$ (20 dB bandwidth, 25 kHz); 20 dB bandwidth $\leq$ 250 kHz.
	▪ $50 > N \geq 25$ and $ChS \geq \text{MAX}$ (20 dB bandwidth, 25 kHz); 20 dB bandwidth $>$ 250 kHz.
▪ 2400-2483.5 MHz Band:	
	▪ $N \geq 75$ and $ChS \geq \text{MAX}$ (20 dB bandwidth, 25 kHz).
	▪ $75 > N \geq 15$ and $ChS \geq \text{MAX}$ (20 dB bandwidth 2/3, 25 kHz).
▪ 5725-5850 MHz Band:	
	▪ $N \geq 75$ and $ChS \geq \text{MAX}$ (20 dB bandwidth, 25 kHz); 20 dB bandwidth $\leq$ 1 MHz.
N: Number of Hopping Frequencies; ChS: Hopping Channel Separation	

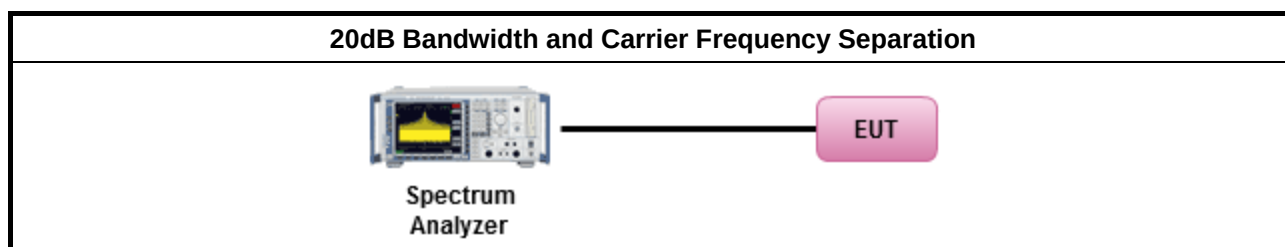
3.2.2 Measuring Instruments

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

3.2.3 Test Procedures

Test Method
▪ Refer as ANSI C63.10-2013, clause 6.9.1 for 20 dB bandwidth measurement.
▪ Refer as ANSI C63.10-2013, clause 7.8.2 for carrier frequency separation measurement.

3.2.4 Test Setup



3.2.5 Test Result of 20dB Bandwidth

Refer as Appendix B.1

3.2.6 Test Result of Carrier Frequency Separation

Refer as Appendix B.2

3.3 Maximum EIRP Output Power

3.3.1 Maximum EIRP Output Power Limit

The EIRP limit for output power is 21.76dBm(150mW).

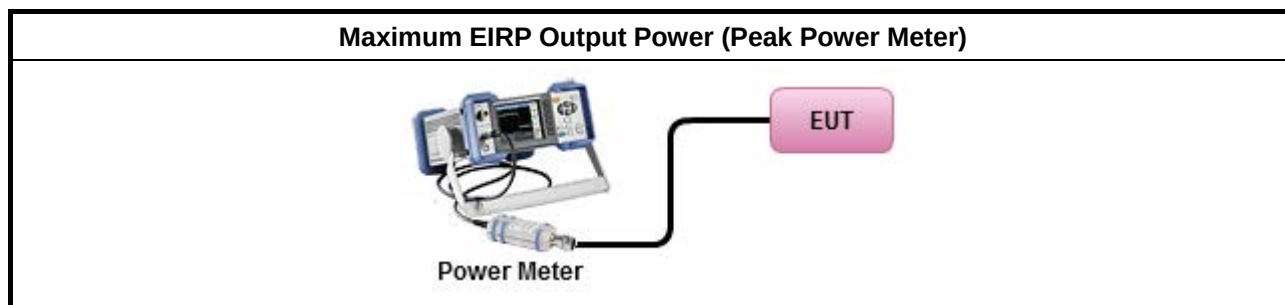
3.3.2 Measuring Instruments

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

3.3.3 Test Procedures

Test Method
Refer as ANSI C63.10-2013, clause 7.8.5 for output power measurement.

3.3.4 Test Setup



3.3.5 Test Result of Maximum EIRP Output Power

Refer as Appendix C

3.4 Number of Hopping Frequencies and Hopping Bandedge

3.4.1 Number of Hopping Frequencies Limit

Number of Hopping Frequencies Limit	
▪ 902-928 MHz Band:	
	▪ $N \geq 50$ and $ChS \geq MAX$ (20 dB bandwidth, 25 kHz); 20 dB bandwidth ≤ 250 kHz.
	▪ $50 > N \geq 25$ and $ChS \geq MAX$ (20 dB bandwidth, 25 kHz); 20 dB bandwidth > 250 kHz.
▪ 2400-2483.5 MHz Band:	
	▪ $N \geq 75$ and $ChS \geq MAX$ (20 dB bandwidth, 25 kHz).
	▪ $75 > N \geq 15$ and $ChS \geq MAX$ (20 dB bandwidth 2/3, 25 kHz).
▪ 5725-5850 MHz Band:	
	▪ $N \geq 75$ and $ChS \geq MAX$ (20 dB bandwidth, 25 kHz); 20 dB bandwidth ≤ 1 MHz.
N: Number of Hopping Frequencies; ChS : Hopping Channel Separation	

3.4.2 Hopping Bandedge Limit

Refer clause 3.6.1 and clause 3.7.1

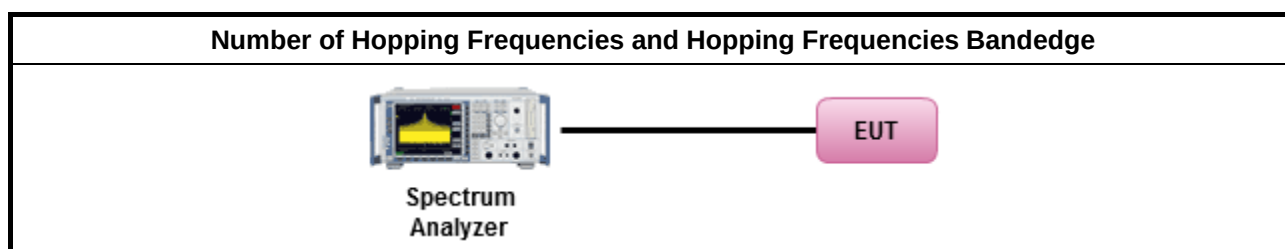
3.4.3 Measuring Instruments

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

3.4.4 Test Procedures

Test Method
▪ Refer as ANSI C63.10-2013, clause 7.8.3 for number of hopping frequencies measurement.
▪ Refer as ANSI C63.10-2013, clause 7.8.6 for hopping frequencies Bandedge measurement.

3.4.5 Test Setup



3.4.6 Test Result of Number of Hopping Frequencies

Refer as Appendix D

3.4.7 Test Result of Number of Hopping Frequencies Bandedge

Refer as Appendix D

3.5 Time of Occupancy (Dwell Time)

3.5.1 Time of Occupancy (Dwell Time) Limit

20dB Bandwidth and Carrier Frequency Separation Limit for Frequency Hopping Systems	
▪ 902-928 MHz Band:	
	▪ $N \geq 50$; 0.4s in 20s period
	▪ $50 > N \geq 25$; 0.4s in 10s period
▪ 2400-2483.5 MHz Band:	
	▪ $N \geq 75$; 0.4s in $N \times 0.4$ period
	▪ $75 > N \geq 15$; 0.4s in $N \times 0.4$ period
▪ 5725-5850 MHz Band:	
	▪ $N \geq 75$; 0.4s in 30s period
N: Number of Hopping Frequencies	

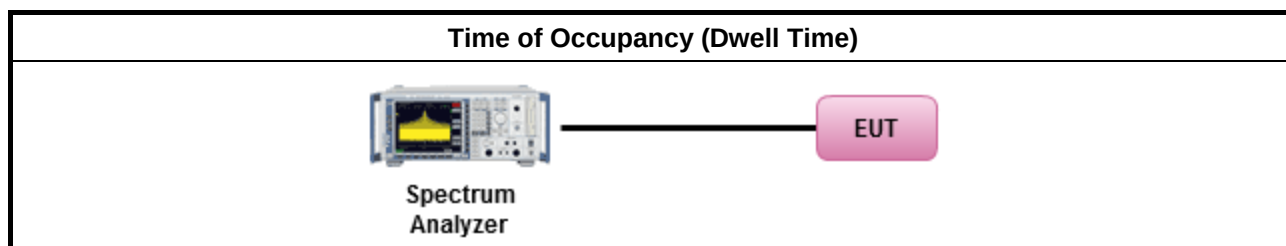
3.5.2 Measuring Instruments

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

3.5.3 Test Procedures

Test Method	
▪ Refer as ANSI C63.10-2013, clause 7.8.4 for dwell time measurement.	
▪ Bluetooth ACL packets can be 1, 3, or 5 time slots. Following as dwell time. Operate DH5 at maximum dwell time and maximum duty cycle.	
	▪ The DH5 packet can cover up to 5 time slots. Operate DH5 at maximum dwell time and maximum duty cycle. A maximum length packet has duration of 5 time slots. The hopping rate is 1600 hops/second so the maximum dwell time is $5/1600$ seconds, or 3.125ms. DH5 Packet permit maximum $1600 / 79 / 6 = 3.37$ hops per second in each channel.

3.5.4 Test Setup



3.5.5 Test Result of Time of Occupancy (Dwell Time)

Refer as Appendix E

3.6 Emissions in Non-restricted Frequency Bands

3.6.1 Emissions in Non-restricted Frequency Bands Limit

Un-restricted Band Emissions Limit	
RF output power procedure	Limit (dB)
Peak output power procedure	20
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.	

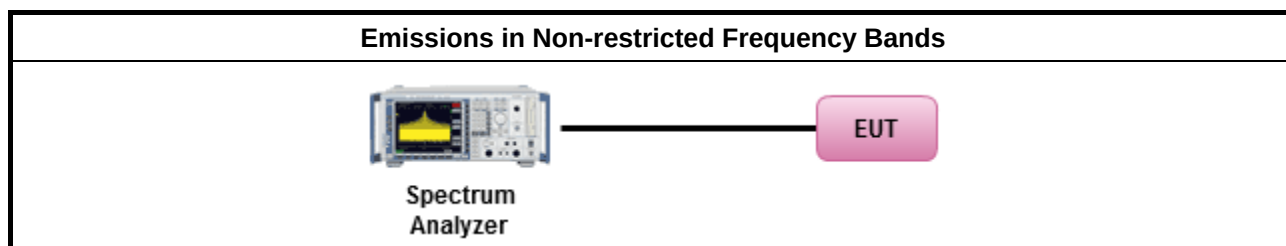
3.6.2 Measuring Instruments

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

3.6.3 Test Procedures

Test Method
Refer as ANSI C63.10-2013, clause 7.8.8 for unwanted emissions into non-restricted bands.

3.6.4 Test Setup



3.6.5 Test Result of Emissions in Non-restricted Frequency Bands

Refer as Appendix F

3.7 Emissions in Restricted Frequency Bands

3.7.1 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.

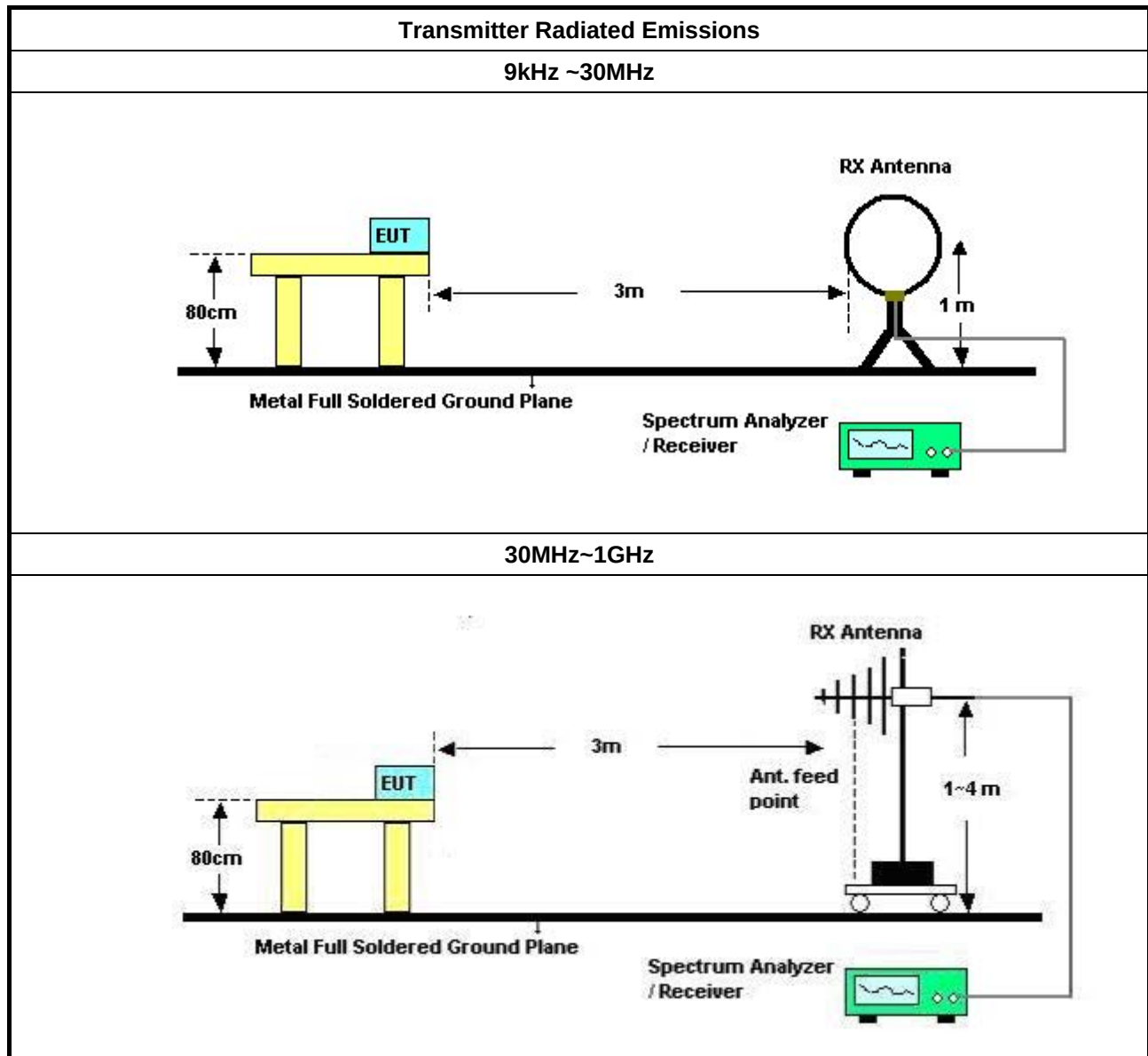
3.7.2 Measuring Instruments

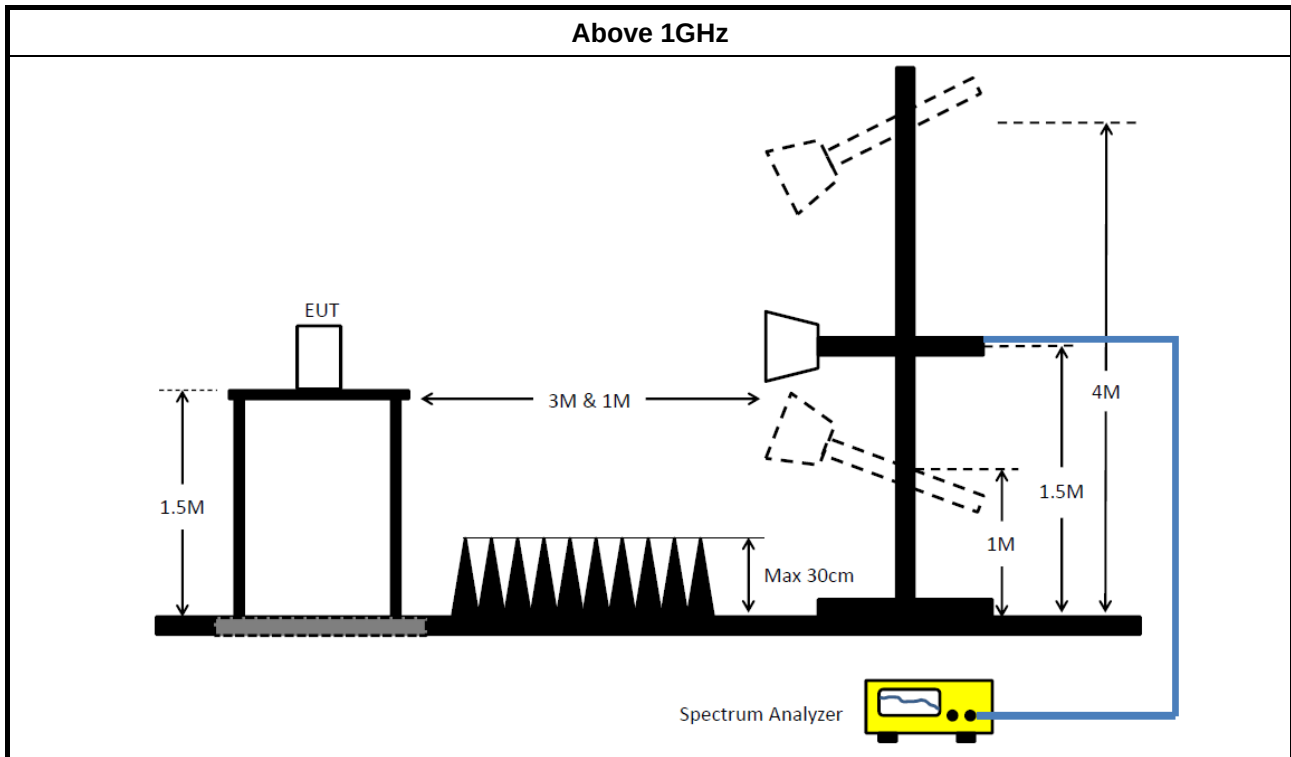
Refer a test equipment and calibration data table in this test report.

3.7.3 Test Procedures

Test Method	
▪ The average emission levels shall be measured in [hopping 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 ANSI C63.10, clause 4.1.4.2.1 QP value.
	▪ Refer as ANSI C63.10, clause 4.1.4.2.2 measurement procedure peak.
	▪ Refer as ANSI C63.10, clause 4.1.4.2.4 average value of hopping pulsed emissions.

3.7.4 Test Setup





3.7.5 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.

3.7.6 Transmitter Radiated Unwanted Emissions

Refer as Appendix G



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. 27, 2016	Conduction (CO01-CB)
LISN	F.C.C.	FCC-LISN-50-16-2	04083	150kHz ~ 100MHz	Dec. 08, 2015	Conduction (CO01-CB)
LISN	Schwarzbeck	NSLK 8127	8127647	9kHz ~ 30MHz	Dec. 23, 2015	Conduction (CO01-CB)
COND Cable	Woken	Cable	01	150kHz ~ 30MHz	May 24, 2016	Conduction (CO01-CB)
Software	Audix	E3	6.120210n	-	N.C.R.	Conduction (CO01-CB)
BILOG ANTENNA	TESEQ	CBL6112D	37880	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	Agilent	8447D	2944A10991	0.1MHz ~ 1.3GHz	Mar. 15, 2016	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8449B	3008A02310	1GHz ~ 26.5GHz	Jan. 18, 2016	Radiation (03CH01-CB)
Spectrum Analyzer	R&S	FSP40	100056	9kHz ~ 40GHz	Oct. 27, 2015	Radiation (03CH01-CB)
Spectrum Analyzer	R&S	FSP40	100056	9kHz ~ 40GHz	Nov. 21, 2016	Radiation (03CH01-CB)
EMI Test	R&S	ESCS	100355	9kHz ~ 2.75GHz	May 16, 2016	Radiation (03CH01-CB)
RF Cable-low	Woken	Low Cable-1	N/A	30 MHz ~ 1 GHz	Nov. 02, 2015	Radiation (03CH01-CB)
RF Cable-low	Woken	Low Cable-1	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	Nov. 02, 2015	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-17	N/A	1 GHz ~ 18 GHz	Nov. 02, 2015	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-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	Nov. 02, 2015	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	Nov. 02, 2015	Radiation (03CH01-CB)



Radio Test Report

Report No. : FR692918-03AC

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
RF Cable-high	Woken	High Cable-40G-2	N/A	18GHz ~ 40 GHz	Oct. 24, 2016	Radiation (03CH01-CB)
Test Software	Audix	E3	6.2009-10-7	N/A	N/A	Radiation (03CH01-CB)
Spectrum analyzer	R&S	FSV40	100979	9kHz~40GHz	Dec. 09, 2015	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	MY54320014	50MHz~18GHz	Apr. 20, 2016	Conducted (TH01-CB)

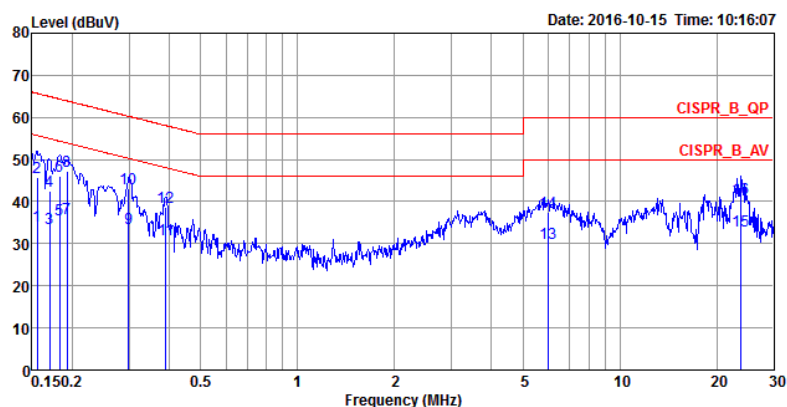
Note: Calibration Interval of instruments listed above is one year.

“*” Calibration Interval of instruments listed above is two years.

N.C.R means Non-Calibration required.

AC Power-line Conducted Emissions Result

Operating Mode	1	Power Phase	Neutral
Operating Function	Normal Link		

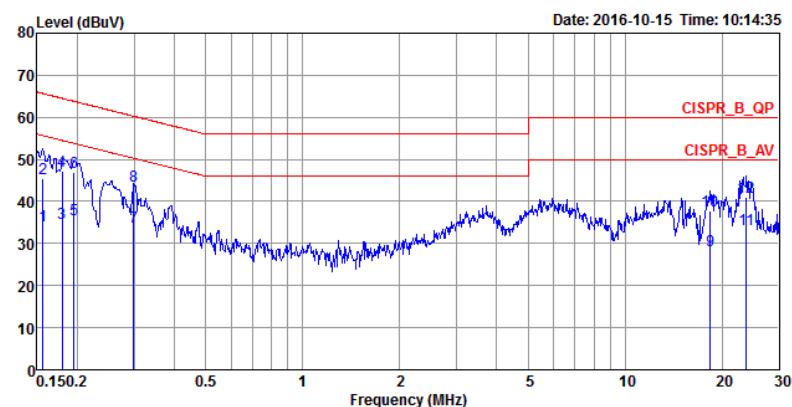


	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Pol/Phase	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB		
1	0.1557	34.37	-21.32	55.69	24.19	10.02	0.16	NEUTRAL	Average
2	0.1557	45.74	-19.95	65.69	35.56	10.02	0.16	NEUTRAL	QP
3	0.1703	33.52	-21.42	54.94	23.33	10.02	0.17	NEUTRAL	Average
4	0.1703	42.57	-22.37	64.94	32.38	10.02	0.17	NEUTRAL	QP
5	0.1825	35.83	-18.54	54.37	25.73	9.92	0.18	NEUTRAL	Average
6	0.1825	45.96	-18.41	64.37	35.86	9.92	0.18	NEUTRAL	QP
7	0.1924	35.97	-17.96	53.93	25.86	9.92	0.19	NEUTRAL	Average
8	0.1924	47.33	-16.60	63.93	37.22	9.92	0.19	NEUTRAL	QP
9	0.2987	33.72	-16.56	50.28	23.71	9.92	0.09	NEUTRAL	Average
10	0.2987	43.15	-17.13	60.28	33.14	9.92	0.09	NEUTRAL	QP
11	0.3893	30.96	-17.12	48.08	21.02	9.92	0.02	NEUTRAL	Average
12	0.3893	38.65	-19.43	58.08	28.71	9.92	0.02	NEUTRAL	QP
13	5.9925	30.21	-19.79	50.00	20.05	10.04	0.12	NEUTRAL	Average
14	5.9925	37.51	-22.49	60.00	27.35	10.04	0.12	NEUTRAL	QP
15	23.7616	33.16	-16.84	50.00	22.49	10.41	0.26	NEUTRAL	Average
16	23.7616	40.69	-19.31	60.00	30.02	10.41	0.26	NEUTRAL	QP

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	1	Power Phase	Line
Operating Function	Normal Link		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Pol/Phase	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB		
1	0.1565	34.34	-21.31	55.65	24.15	10.02	0.17	LINE	Average
2	0.1565	45.53	-20.12	65.65	35.34	10.02	0.17	LINE	QP
3	0.1796	34.85	-19.65	54.50	24.75	9.92	0.18	LINE	Average
4	0.1796	47.16	-17.34	64.50	37.06	9.92	0.18	LINE	QP
5	0.1955	35.62	-18.18	53.80	25.51	9.92	0.19	LINE	Average
6	0.1955	46.98	-16.82	63.80	36.87	9.92	0.19	LINE	QP
7	0.2987	33.87	-16.41	50.28	23.86	9.92	0.09	LINE	Average
8	0.2987	43.55	-16.73	60.28	33.54	9.92	0.09	LINE	QP
9	18.4258	28.29	-21.71	50.00	17.78	10.28	0.23	LINE	Average
10	18.4258	37.79	-22.21	60.00	27.28	10.28	0.23	LINE	QP
11	23.7616	33.29	-16.71	50.00	22.62	10.41	0.26	LINE	Average
12	23.7616	41.12	-18.88	60.00	30.45	10.41	0.26	LINE	QP

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.)



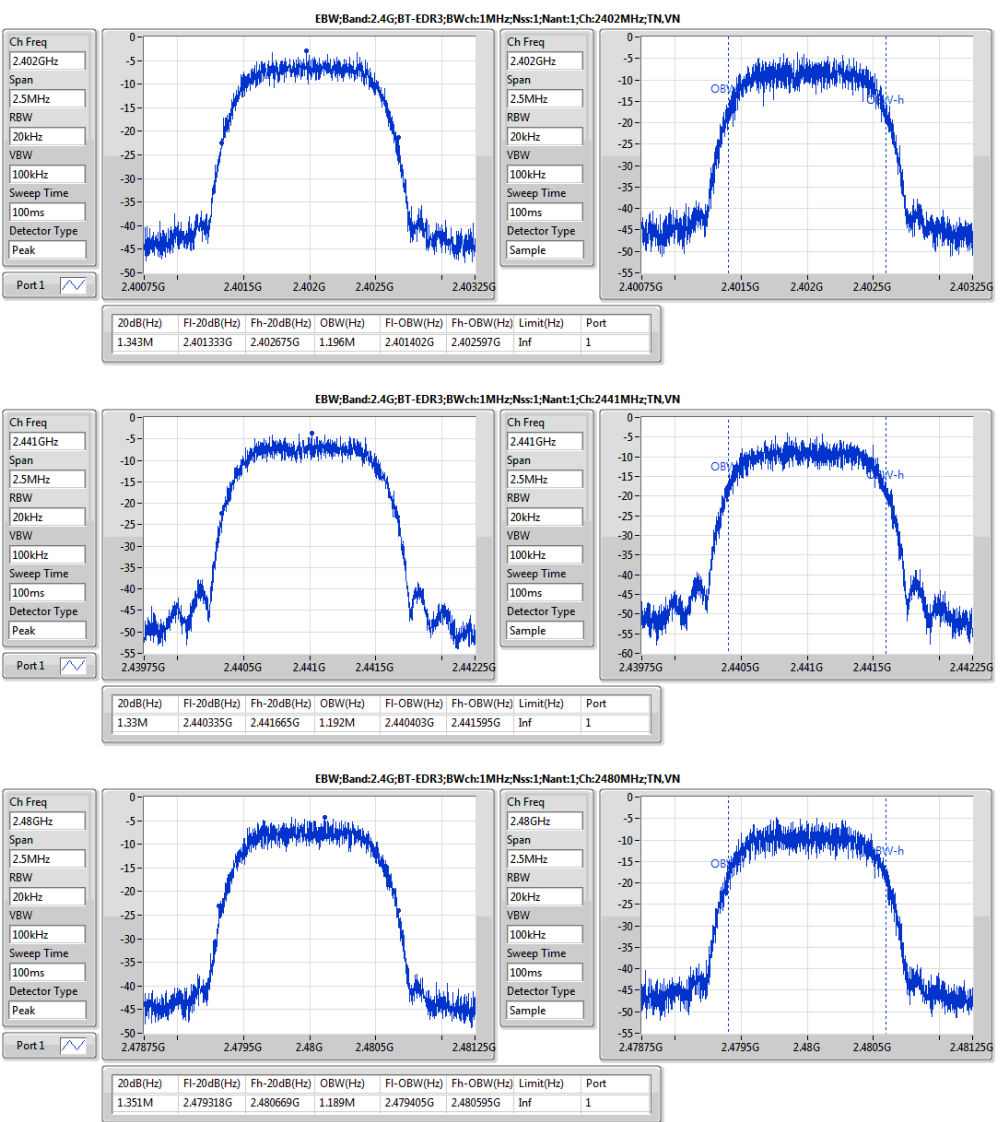
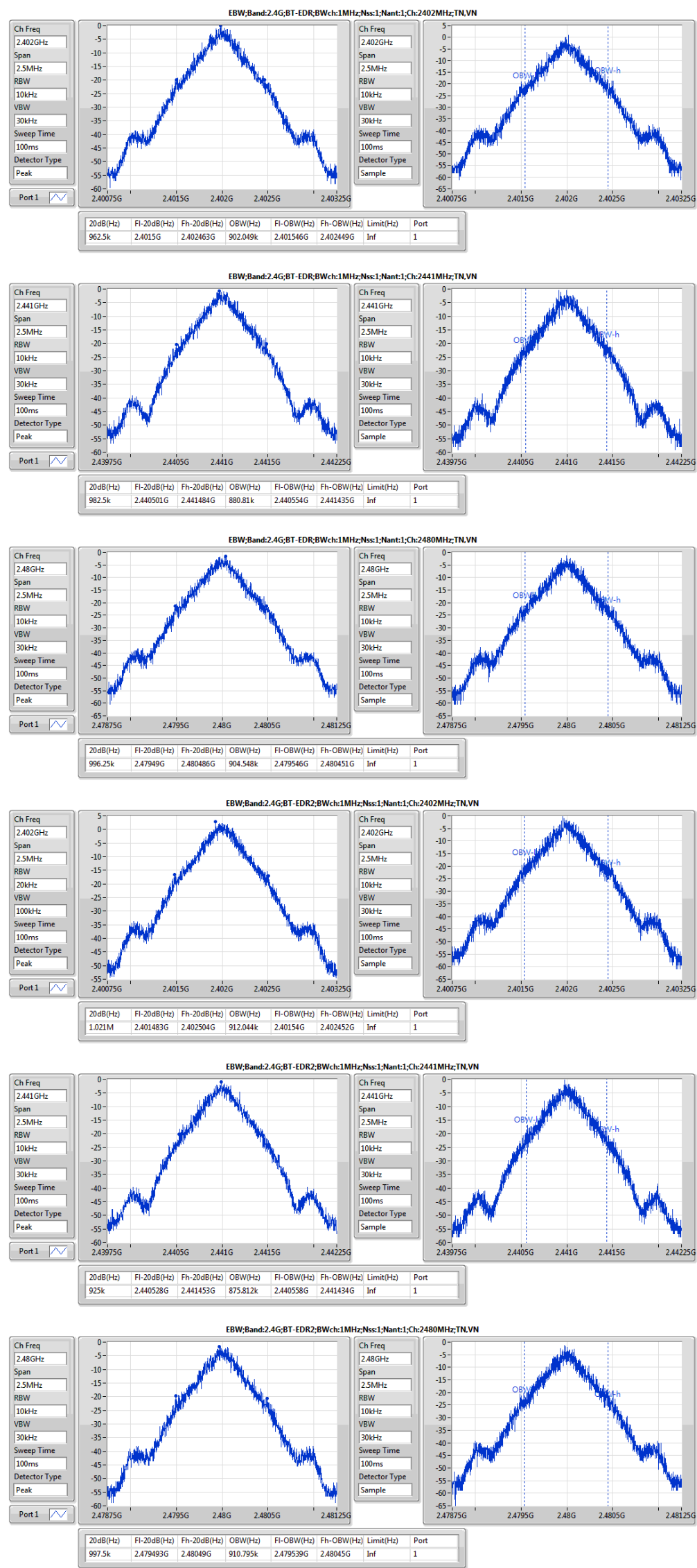
Summary

Mode	Max-N dB (Hz)	Max-OBW (Hz)	ITU-Code	Min-N dB (Hz)	Min-OBW (Hz)
2.4G;BT-EDR;Nss1;Ntx1	996.25k	904.548k	905kG1D	962.5k	880.81k
2.4G;BT-EDR2;Nss1;Ntx1	1.021M	912.044k	912kG1D	925k	875.812k
2.4G;BT-EDR3;Nss1;Ntx1	1.351M	1.196M	1M20G1D	1.33M	1.189M



Result

Mode	Result	Limit (Hz)	P1-N dB (Hz)	P1-OBW (Hz)
2.4G;BT-EDR;Nss1;Ntx1;2402	Pass	Inf	962.5k	902.049k
2.4G;BT-EDR;Nss1;Ntx1;2441	Pass	Inf	982.5k	880.81k
2.4G;BT-EDR;Nss1;Ntx1;2480	Pass	Inf	996.25k	904.548k
2.4G;BT-EDR2;Nss1;Ntx1;2402	Pass	Inf	1.021M	912.044k
2.4G;BT-EDR2;Nss1;Ntx1;2441	Pass	Inf	925k	875.812k
2.4G;BT-EDR2;Nss1;Ntx1;2480	Pass	Inf	997.5k	910.795k
2.4G;BT-EDR3;Nss1;Ntx1;2402	Pass	Inf	1.343M	1.196M
2.4G;BT-EDR3;Nss1;Ntx1;2441	Pass	Inf	1.33M	1.192M
2.4G;BT-EDR3;Nss1;Ntx1;2480	Pass	Inf	1.351M	1.189M





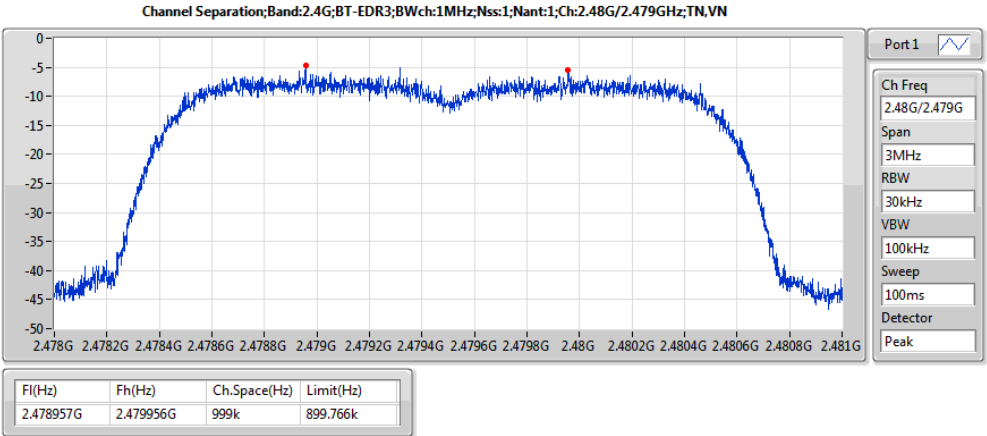
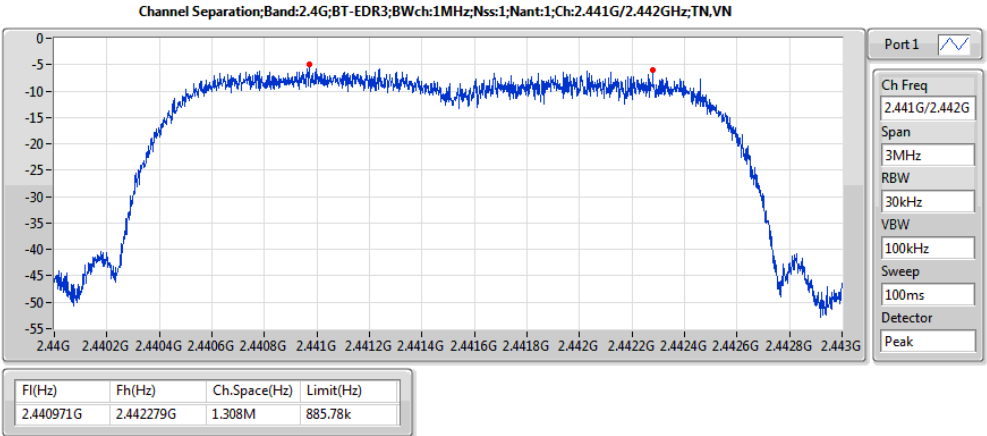
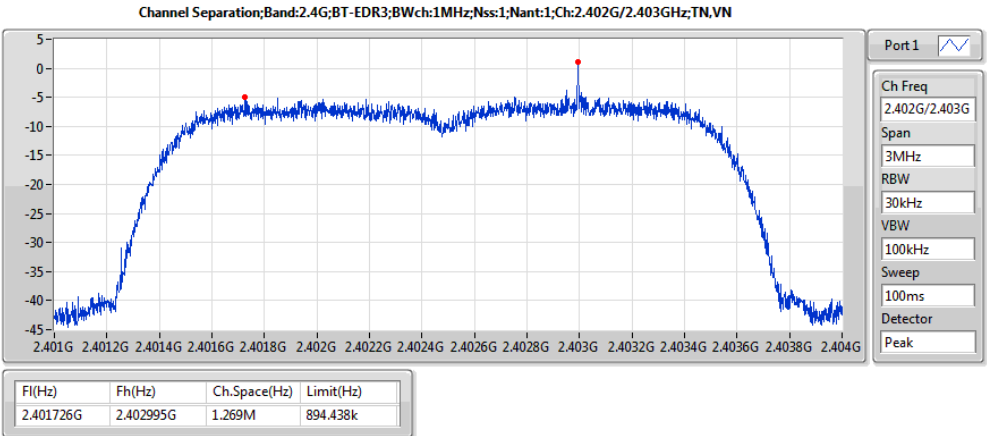
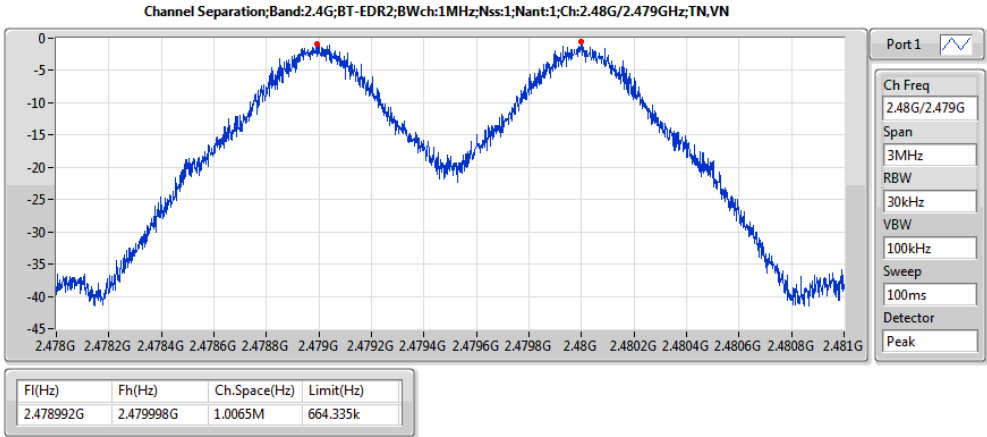
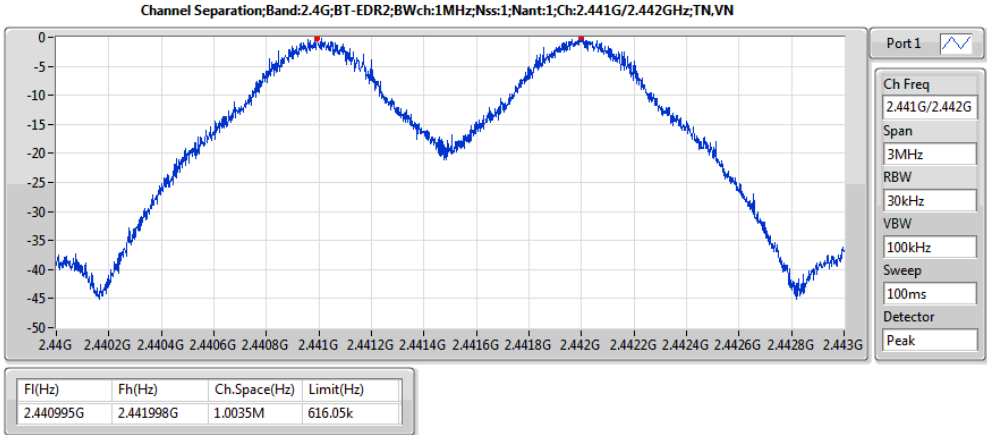
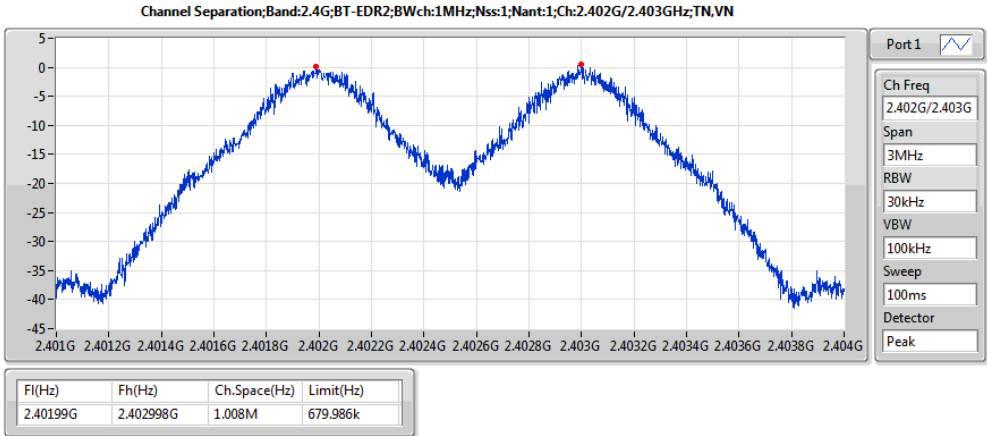
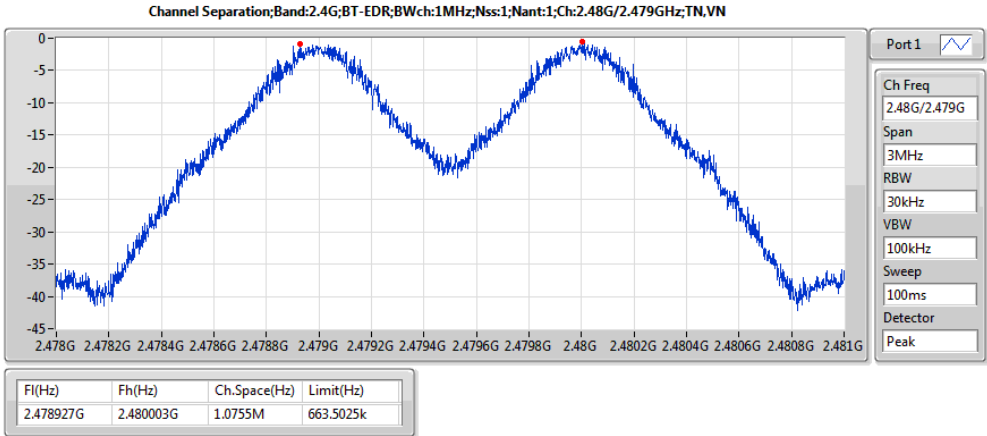
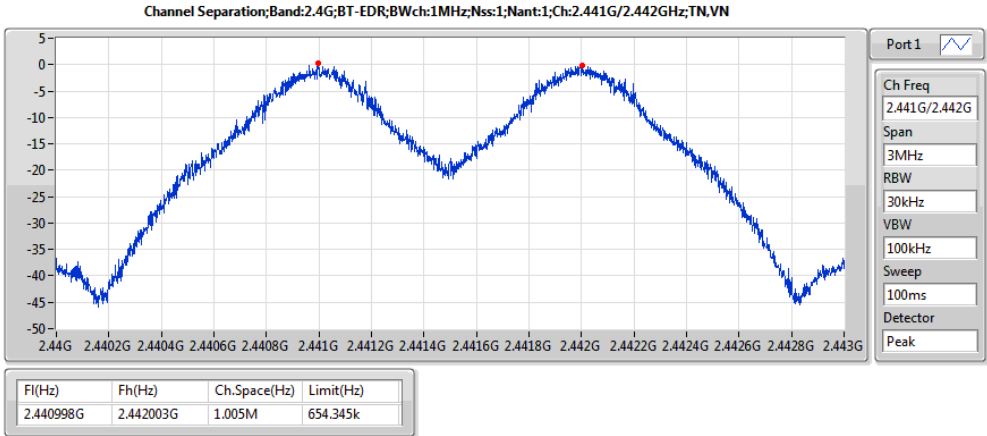
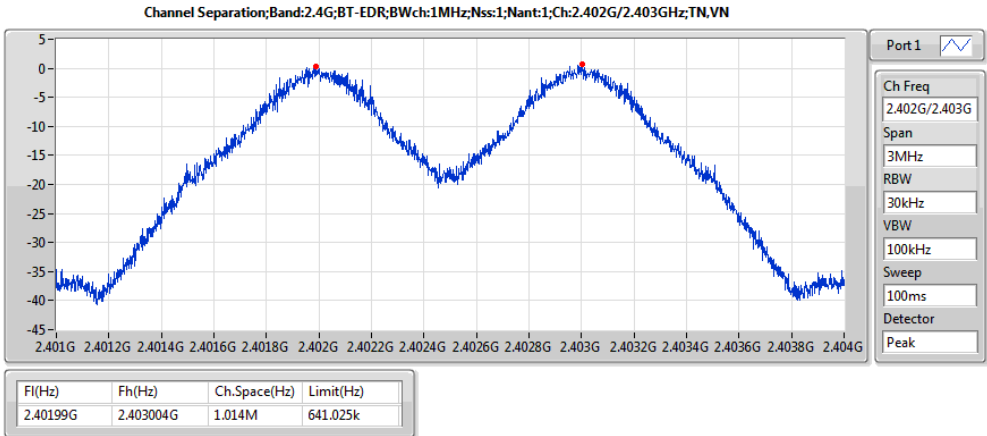
Summary

Mode	Max-Space (Hz)	Min-Space (Hz)
2.4G;BT-EDR;Nss1;Ntx1	1.0755M	1.005M
2.4G;BT-EDR2;Nss1;Ntx1	1.008M	1.0035M
2.4G;BT-EDR3;Nss1;Ntx1	1.308M	999k



Result

Mode	Result	Fl (Hz)	Fh (Hz)	Ch.Space (Hz)	Limit (Hz)
2.4G;BT-EDR;Nss1;Ntx1;2402	Pass	2.40199G	2.403004G	1.014M	641.025k
2.4G;BT-EDR;Nss1;Ntx1;2441	Pass	2.440998G	2.442003G	1.005M	654.345k
2.4G;BT-EDR;Nss1;Ntx1;2480	Pass	2.478927G	2.480003G	1.0755M	663.5025k
2.4G;BT-EDR2;Nss1;Ntx1;2402	Pass	2.40199G	2.402998G	1.008M	679.986k
2.4G;BT-EDR2;Nss1;Ntx1;2441	Pass	2.440995G	2.441998G	1.0035M	616.05k
2.4G;BT-EDR2;Nss1;Ntx1;2480	Pass	2.478992G	2.479998G	1.0065M	664.335k
2.4G;BT-EDR3;Nss1;Ntx1;2402	Pass	2.401726G	2.402995G	1.269M	894.438k
2.4G;BT-EDR3;Nss1;Ntx1;2441	Pass	2.440971G	2.442279G	1.308M	885.78k
2.4G;BT-EDR3;Nss1;Ntx1;2480	Pass	2.478957G	2.479956G	999k	899.766k





Result

Mode	Frequency	Conducted Power (dBm)	EIRP Power (dBm)	Max. EIRP Limit (dBm)	Result
		Chain 1			
BR (GFSK) 1 Mbps	2402 MHz	5.43	8.93	21.76	Complies
	2441 MHz	4.72	8.22	21.76	Complies
	2480 MHz	4.84	8.34	21.76	Complies
EDR ($\pi/4$ -DQPSK) 2 Mbps	2402 MHz	4.75	8.25	21.76	Complies
	2441 MHz	4.36	7.86	21.76	Complies
	2480 MHz	4.52	8.02	21.76	Complies
EDR (8DPSK) 3 Mbps	2402 MHz	4.72	8.22	21.76	Complies
	2441 MHz	4.37	7.87	21.76	Complies
	2480 MHz	4.48	7.98	21.76	Complies



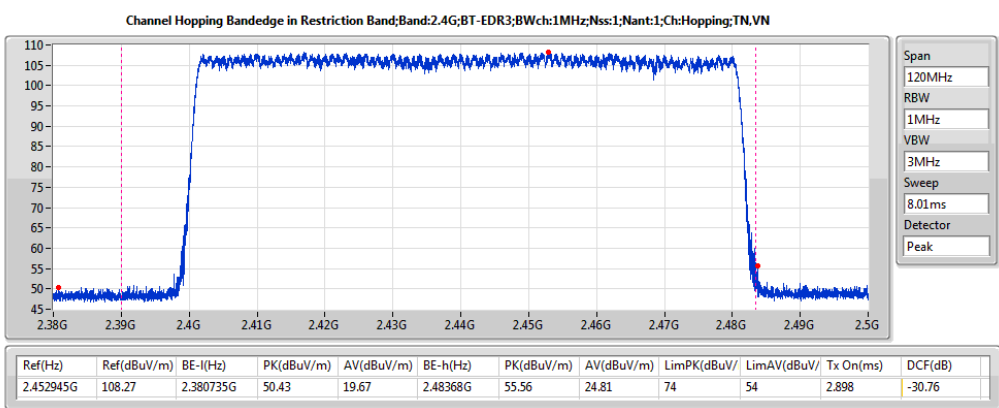
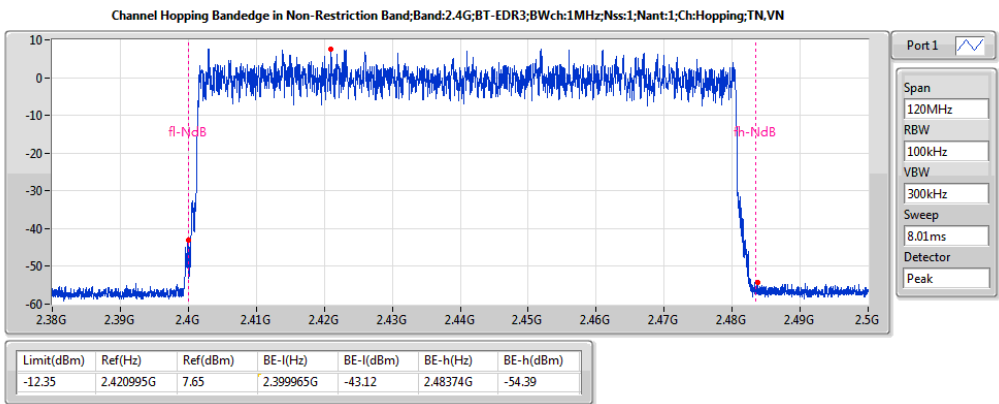
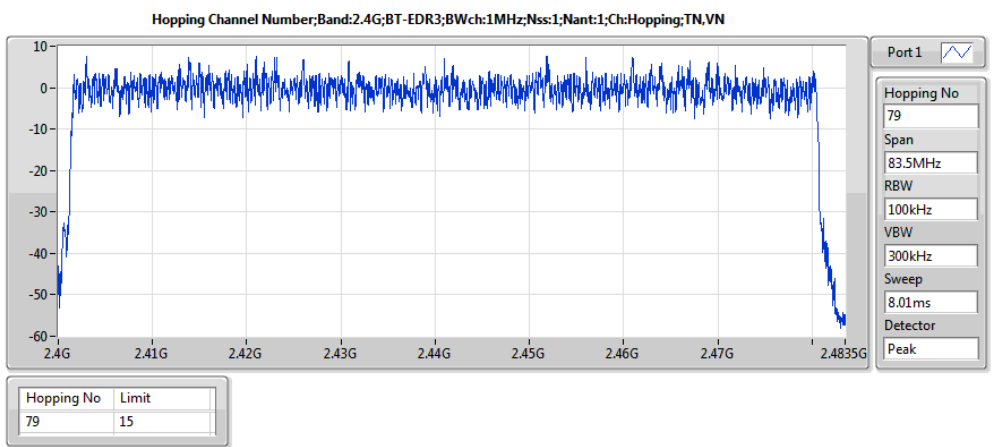
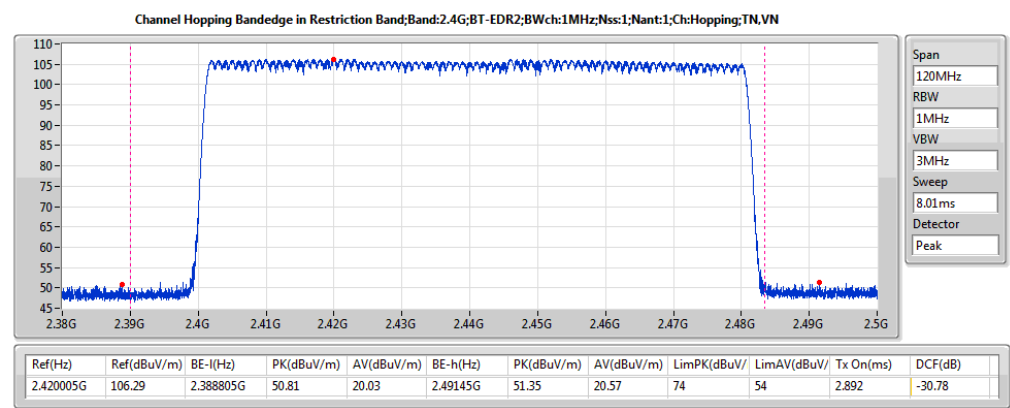
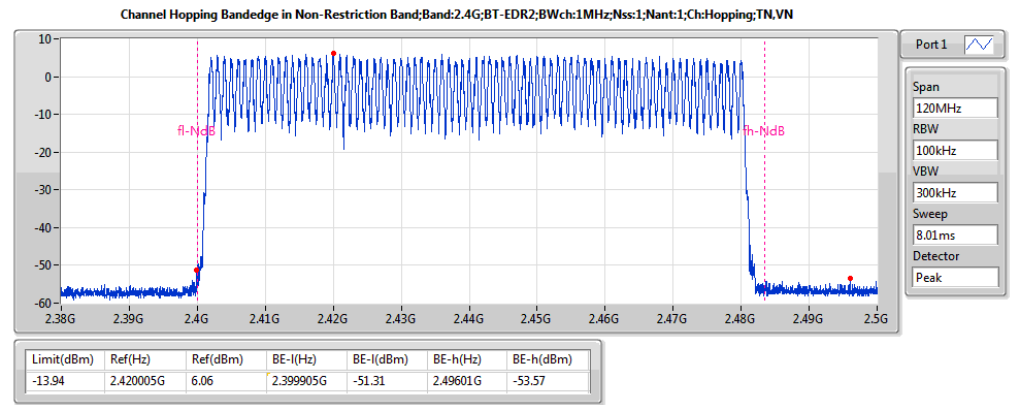
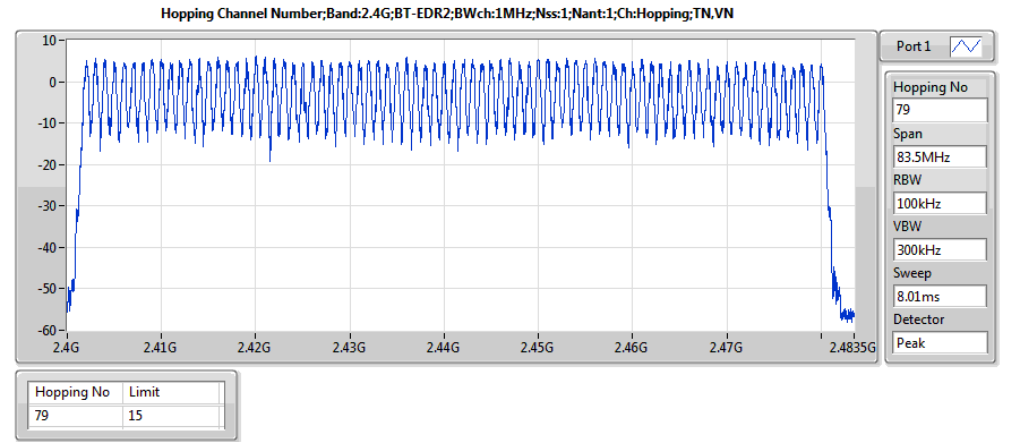
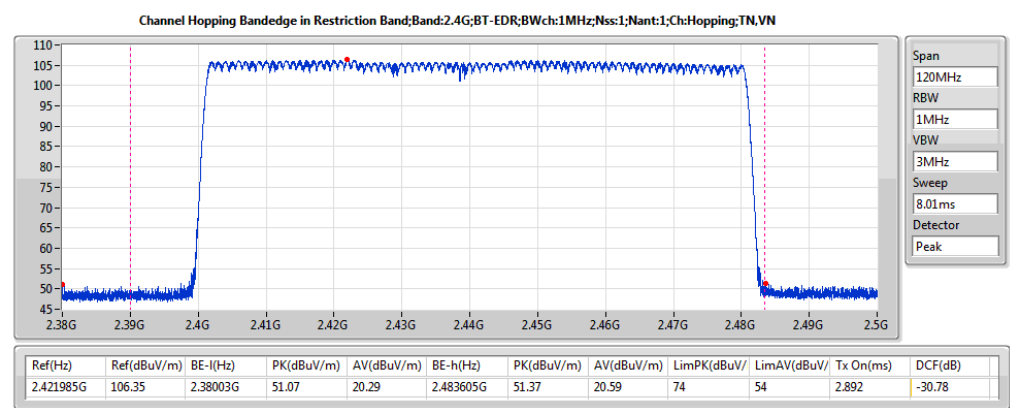
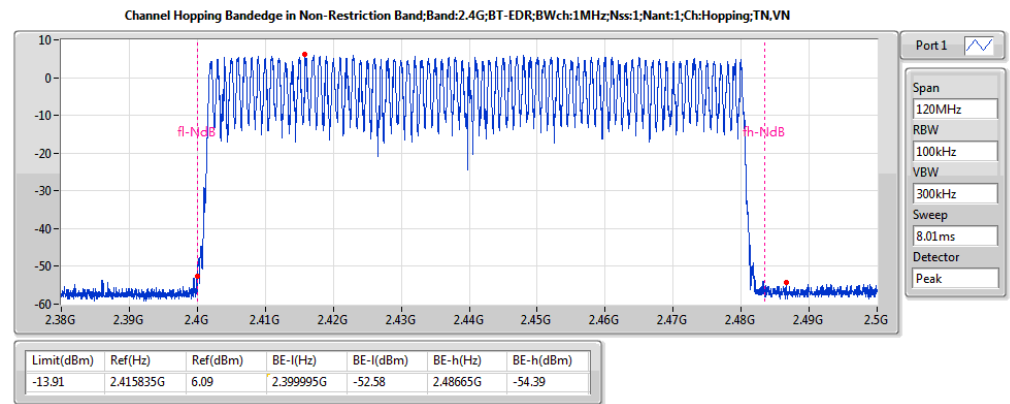
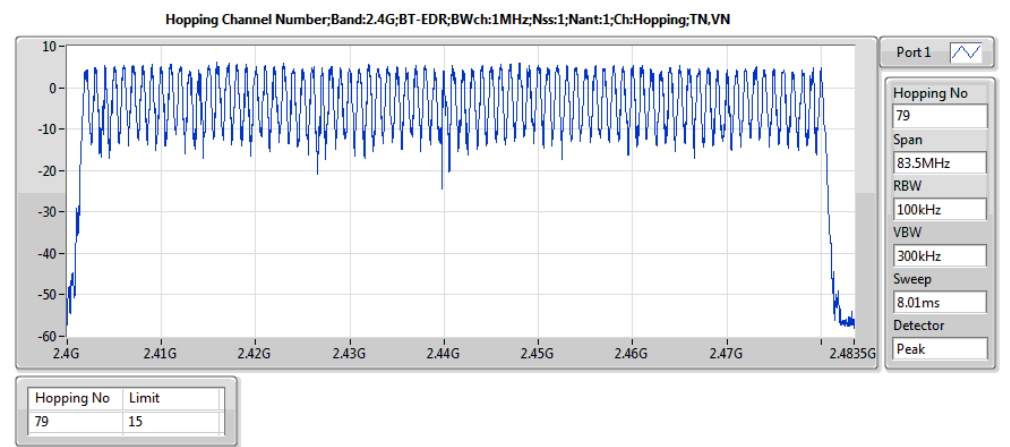
Summary

Mode	Max-Hop No
2.4G;BT-EDR;Nss1;Ntx1	79
2.4G;BT-EDR2;Nss1;Ntx1	79
2.4G;BT-EDR3;Nss1;Ntx1	79



Result

Mode	Result	Hopping No	Limit
2.4G;BT-EDR;Nss1;Ntx1;2402	Pass	79	15
2.4G;BT-EDR;Nss1;Ntx1;2441	Pass	79	15
2.4G;BT-EDR;Nss1;Ntx1;2480	Pass	79	15
2.4G;BT-EDR2;Nss1;Ntx1;2402	Pass	79	15
2.4G;BT-EDR2;Nss1;Ntx1;2441	Pass	79	15
2.4G;BT-EDR2;Nss1;Ntx1;2480	Pass	79	15
2.4G;BT-EDR3;Nss1;Ntx1;2402	Pass	79	15
2.4G;BT-EDR3;Nss1;Ntx1;2441	Pass	79	15
2.4G;BT-EDR3;Nss1;Ntx1;2480	Pass	79	15





Summary

Mode	Max-Dwell (s)
2.4G;BT-EDR3;Nss1;Ntx1	308.9268m

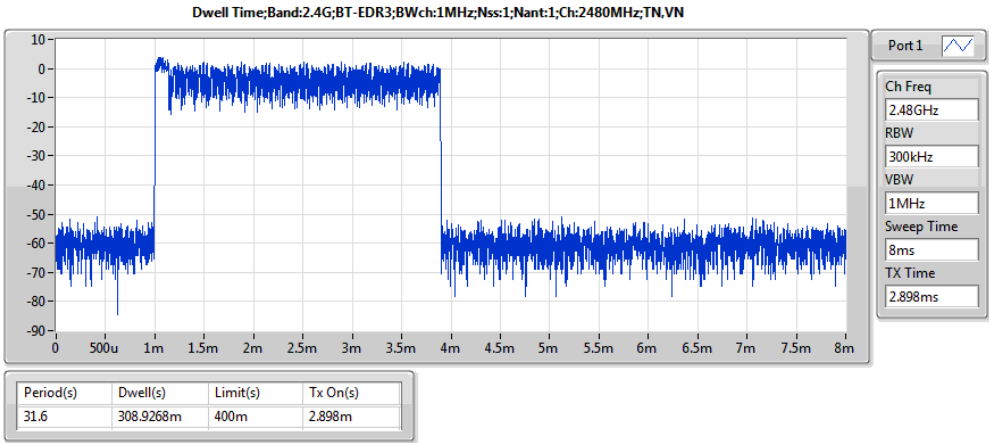
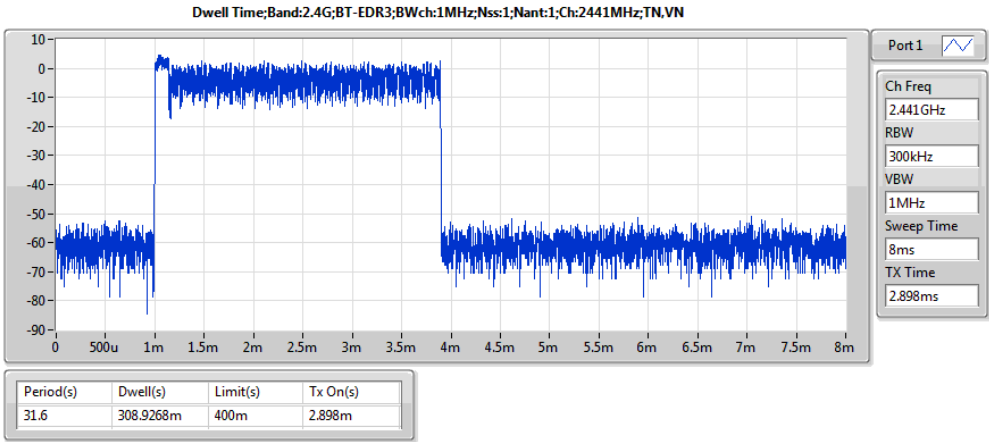
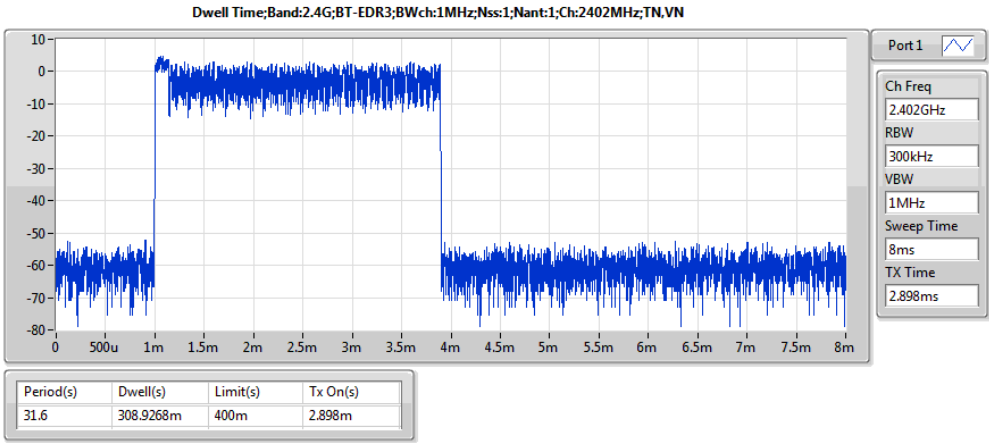


Result

Mode	Result	Period (s)	Dwell (s)	Limit (s)	Tx On (s)
2.4G;BT-EDR3;Nss1;Ntx1;2402	Pass	31.6	308.9268m	400m	2.898m
2.4G;BT-EDR3;Nss1;Ntx1;2441	Pass	31.6	308.9268m	400m	2.898m
2.4G;BT-EDR3;Nss1;Ntx1;2480	Pass	31.6	308.9268m	400m	2.898m



Dwell Time-DSS Result





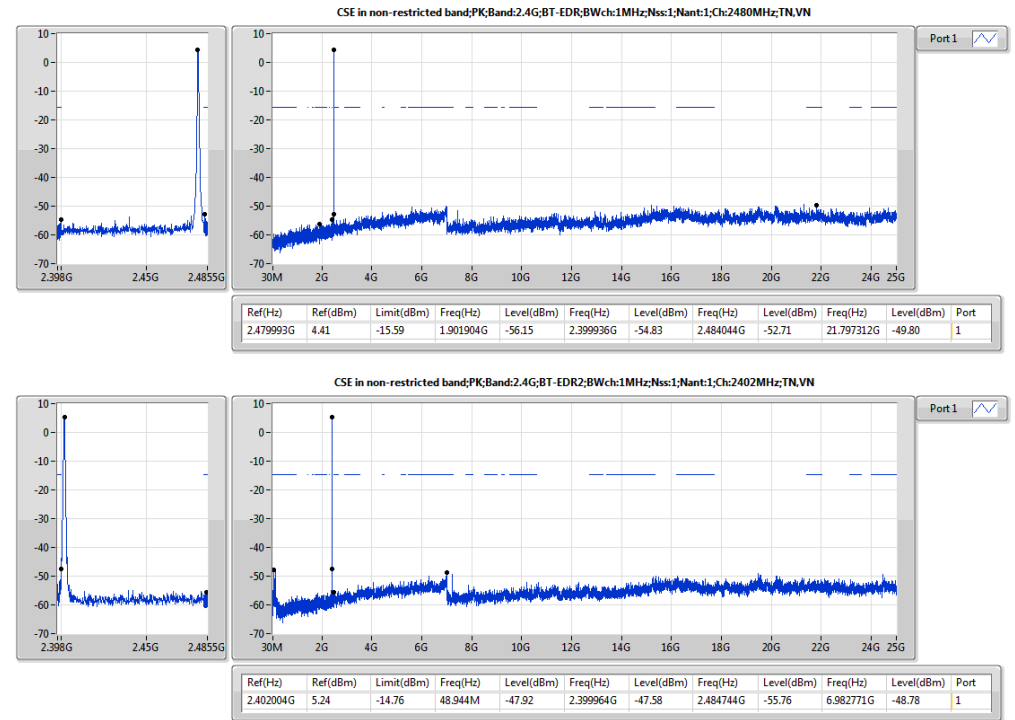
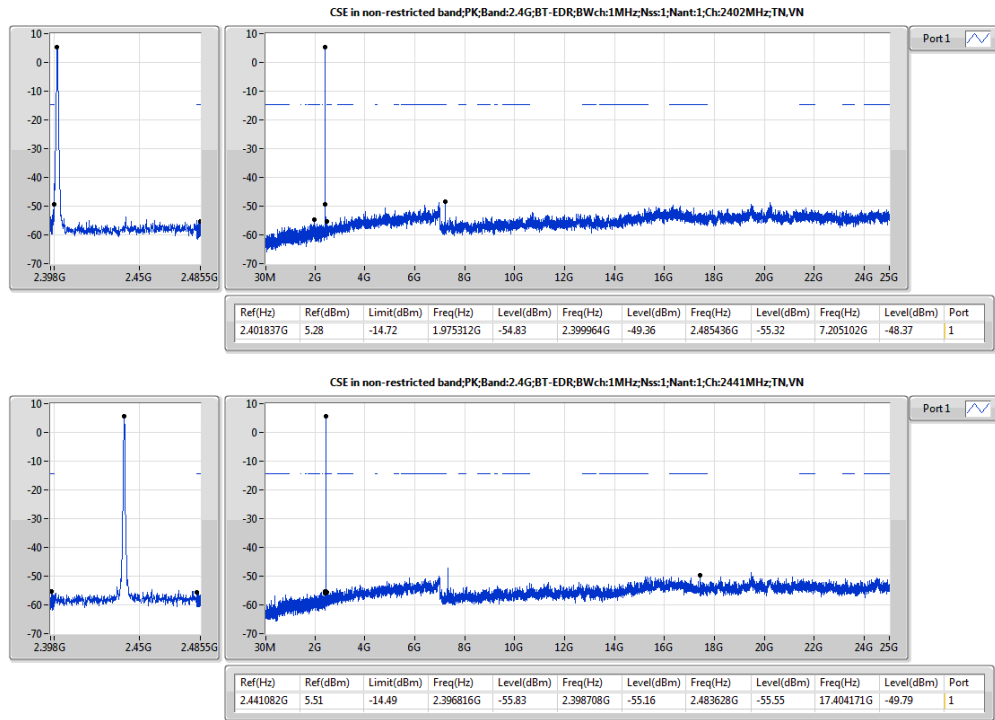
Summary

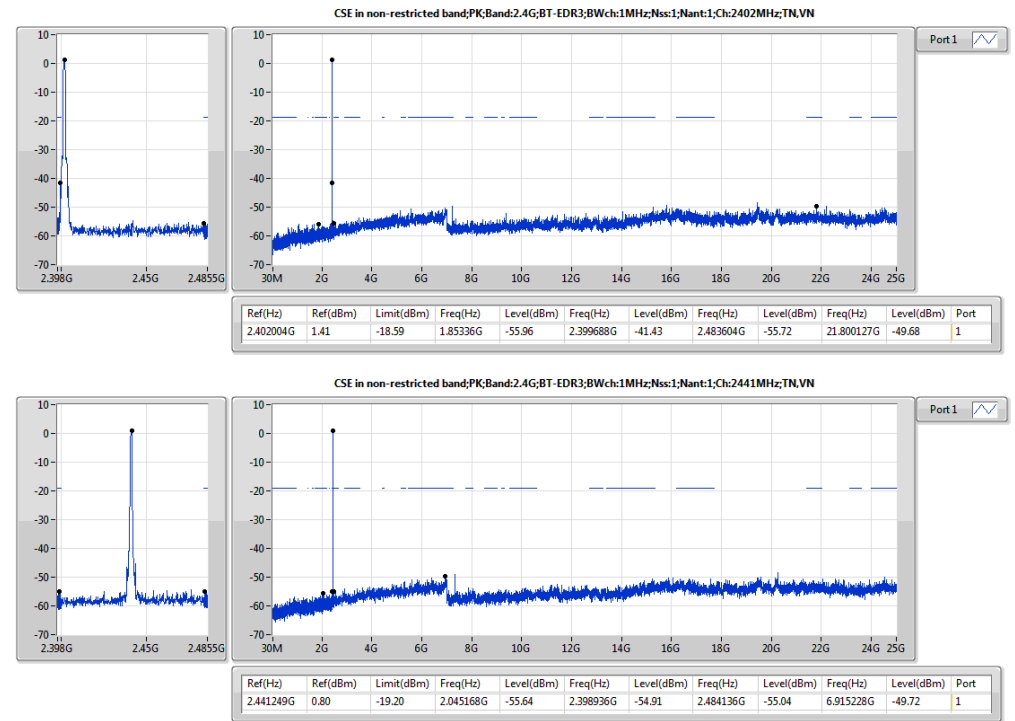
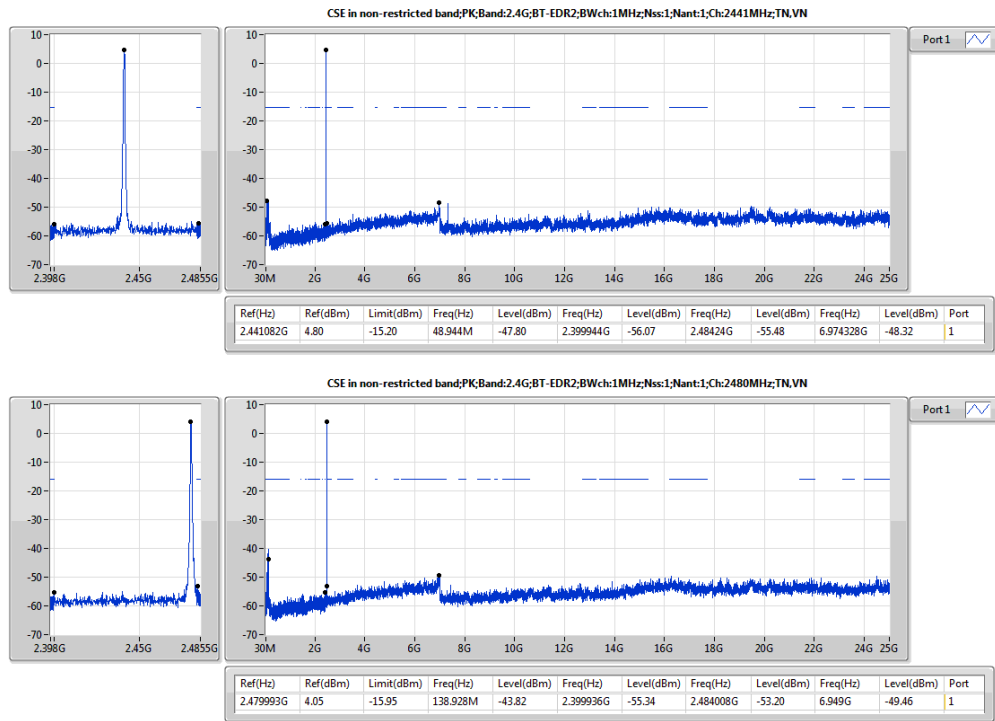
Mode	Result	Ref (Hz)	Ref (dBm)	Limit (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Port
2.4G;BT-EDR3;Nss1;Ntx1;2402	Pass	2.402004G	1.41	-18.59	1.85336G	-55.96	2.399688G	-41.43	2.483604G	-55.72	21.800127G	-49.68	1



Result

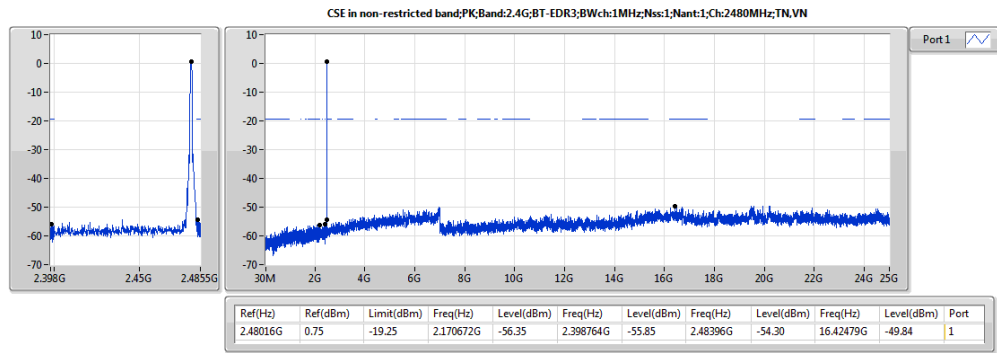
Mode	Result	Ref (Hz)	Ref (dBm)	Limit (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Port
2.4G;BT-EDR;Nss1;Ntx1;2402	Pass	2.401837G	5.28	-14.72	1.975312G	-54.83	2.399964G	-49.36	2.485436G	-55.32	7.205102G	-48.37	1
2.4G;BT-EDR;Nss1;Ntx1;2441	Pass	2.441082G	5.51	-14.49	2.396816G	-55.83	2.398708G	-55.16	2.483628G	-55.55	17.404171G	-49.79	1
2.4G;BT-EDR;Nss1;Ntx1;2480	Pass	2.479993G	4.41	-15.59	1.901904G	-56.15	2.399936G	-54.83	2.484044G	-52.71	21.797312G	-49.80	1
2.4G;BT-EDR2;Nss1;Ntx1;2402	Pass	2.402004G	5.24	-14.76	48.944M	-47.92	2.399964G	-47.58	2.484744G	-55.76	6.982771G	-48.78	1
2.4G;BT-EDR2;Nss1;Ntx1;2441	Pass	2.441082G	4.80	-15.20	48.944M	-47.80	2.399944G	-56.07	2.48424G	-55.48	6.974328G	-48.32	1
2.4G;BT-EDR2;Nss1;Ntx1;2480	Pass	2.479993G	4.05	-15.95	138.928M	-43.82	2.399936G	-55.34	2.484008G	-53.20	6.949G	-49.46	1
2.4G;BT-EDR3;Nss1;Ntx1;2402	Pass	2.402004G	1.41	-18.59	1.85336G	-55.96	2.399688G	-41.43	2.483604G	-55.72	21.800127G	-49.68	1
2.4G;BT-EDR3;Nss1;Ntx1;2441	Pass	2.441249G	0.80	-19.20	2.045168G	-55.64	2.398936G	-54.91	2.484136G	-55.04	6.915228G	-49.72	1
2.4G;BT-EDR3;Nss1;Ntx1;2480	Pass	2.48016G	0.75	-19.25	2.170672G	-56.35	2.398764G	-55.85	2.48396G	-54.30	16.42479G	-49.84	1

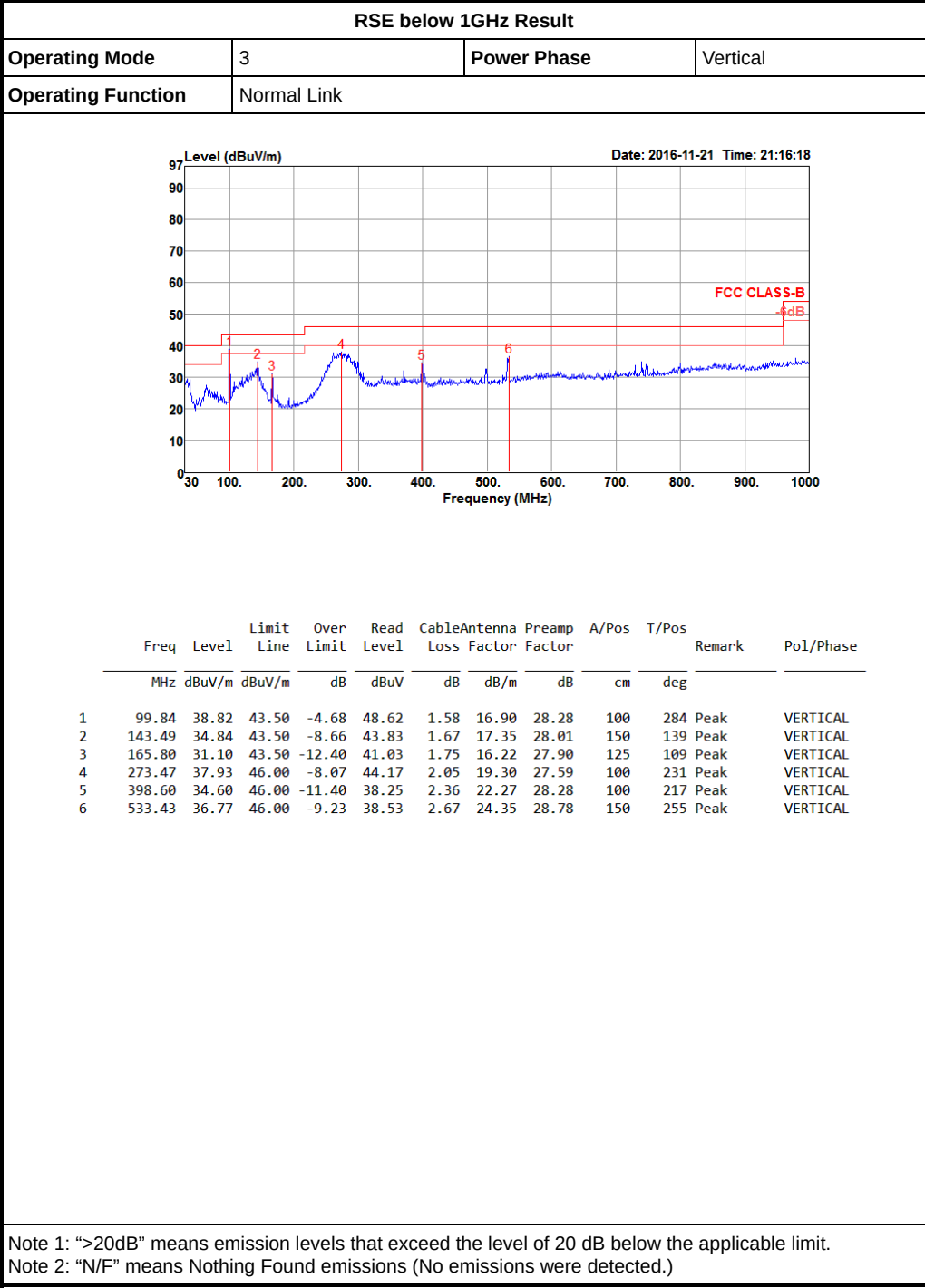
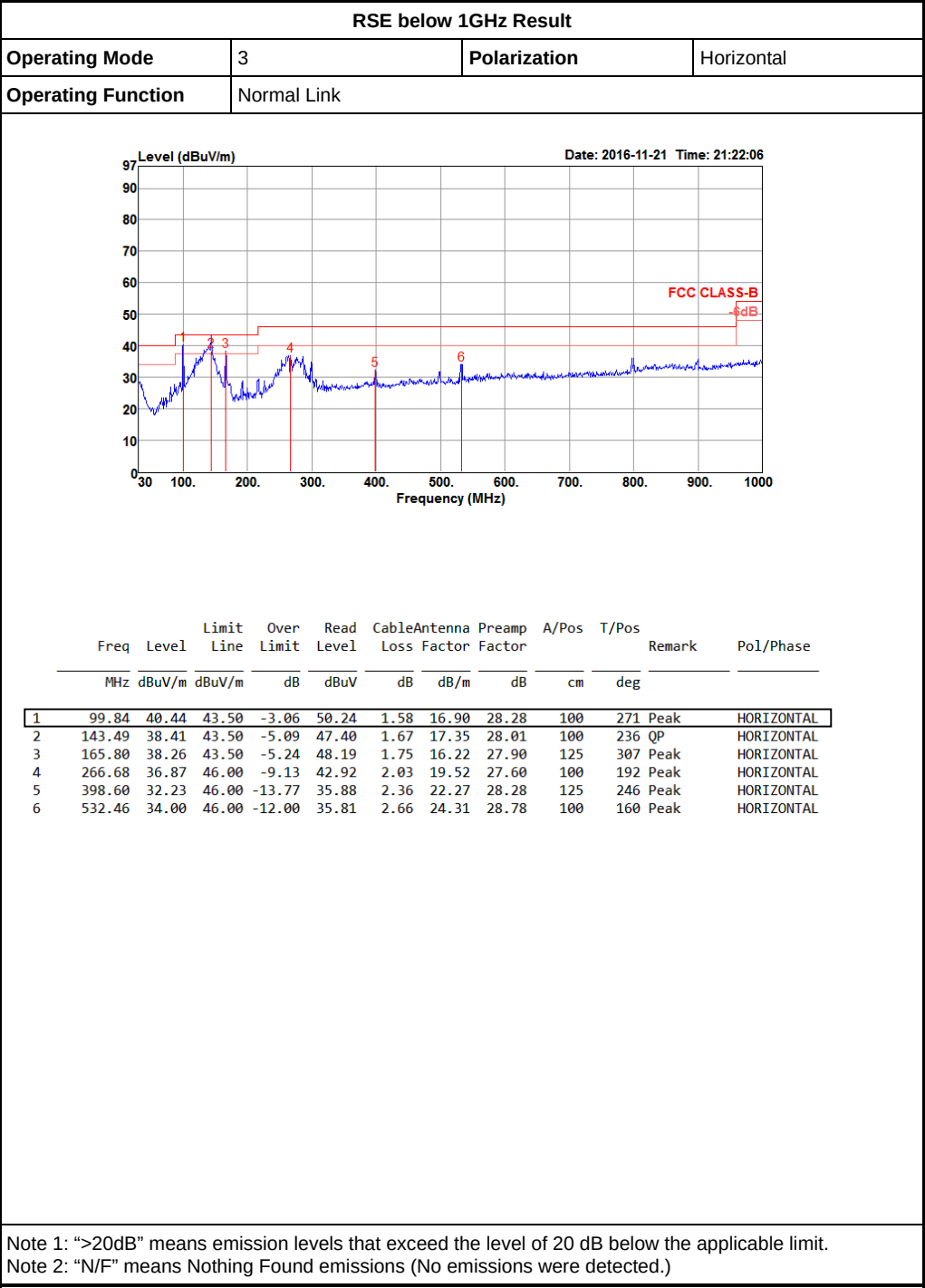






CSEndB-DSS Result





Radiated Emissions (1GHz~10th Harmonic)
For Test Mode: Mode 1

Configurations	BR (GFSK) CH 0 / Chain 1
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Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	4803.57	48.25	74.00	-25.75	40.60	8.33	31.07	31.75	168	206	Peak	HORIZONTAL
2	4804.51	23.81	54.00	-30.19	16.16	8.33	31.07	31.75	168	206	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	4804.14	49.27	74.00	-24.73	41.62	8.33	31.07	31.75	141	180	Peak	VERTICAL
2	4804.22	24.83	54.00	-29.17	17.18	8.33	31.07	31.75	141	180	Average	VERTICAL

Configurations	BR (GFSK) CH 39 / Chain 1
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Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	4881.03	49.50	74.00	-24.50	41.57	8.49	31.15	31.71	129	184	Peak	HORIZONTAL
2	4881.59	25.06	54.00	-28.94	17.08	8.52	31.17	31.71	129	184	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	4882.06	48.78	74.00	-25.22	40.80	8.52	31.17	31.71	127	170	Peak	VERTICAL
2	4882.96	24.34	54.00	-29.66	16.36	8.52	31.17	31.71	127	170	Average	VERTICAL

Configurations	BR (GFSK) CH 78 / Chain 1
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Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	4959.05	24.47	54.00	-29.53	16.20	8.69	31.25	31.67	145	197	Average	HORIZONTAL
2	4960.62	48.91	74.00	-25.09	40.64	8.69	31.25	31.67	145	197	Peak	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	4960.16	24.68	54.00	-29.32	16.41	8.69	31.25	31.67	180	244	Average	VERTICAL
2	4960.98	49.12	74.00	-24.88	40.85	8.69	31.25	31.67	180	244	Peak	VERTICAL

Note:

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

Emission level (dBuV/m) = 20 log Emission level (uV/m).

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

Configurations	EDR (8DPSK) CH 0 / Chain 1
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Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	4803.27	48.05	74.00	-25.95	40.40	8.33	31.07	31.75	170	228	Peak	HORIZONTAL
2	4803.50	23.62	54.00	-30.38	15.97	8.33	31.07	31.75	170	228	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	4803.21	48.81	74.00	-25.19	41.16	8.33	31.07	31.75	163	211	Peak	VERTICAL
2	4804.64	24.37	54.00	-29.63	16.72	8.33	31.07	31.75	163	211	Average	VERTICAL

Configurations	EDR (8DPSK) CH 39 / Chain 1
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Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	4881.17	48.53	74.00	-25.47	40.55	8.52	31.17	31.71	148	205	Peak	HORIZONTAL
2	4881.74	24.09	54.00	-29.91	16.11	8.52	31.17	31.71	148	205	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	4882.37	24.08	54.00	-29.92	16.10	8.52	31.17	31.71	156	208	Average	VERTICAL
2	4882.80	48.52	74.00	-25.48	40.54	8.52	31.17	31.71	156	208	Peak	VERTICAL

Configurations	EDR (8DPSK) CH 78 / Chain 1
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Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	4959.04	48.44	74.00	-25.56	40.17	8.69	31.25	31.67	148	205	Peak	HORIZONTAL
2	4959.57	24.00	54.00	-30.00	15.73	8.69	31.25	31.67	148	205	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	4959.15	24.25	54.00	-29.75	15.98	8.69	31.25	31.67	146	201	Average	VERTICAL
2	4959.19	48.69	74.00	-25.31	40.42	8.69	31.25	31.67	146	201	Peak	VERTICAL

Note:

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

Emission level (dBuV/m) = 20 log Emission level (uV/m).

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

For Test Mode: Mode 2

Configurations	BR (GFSK) CH 0 / Chain 1
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Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	4803.55	48.99	74.00	-25.01	41.34	8.33	31.07	31.75	146	194	Peak	HORIZONTAL
2	4804.21	24.55	54.00	-29.45	16.90	8.33	31.07	31.75	146	194	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	4803.87	23.82	54.00	-30.18	16.17	8.33	31.07	31.75	175	220	Average	VERTICAL
2	4803.93	48.26	74.00	-25.74	40.61	8.33	31.07	31.75	175	220	Peak	VERTICAL

Configurations	BR (GFSK) CH 39 / Chain 1
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Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	4960.16	50.52	74.00	-23.48	42.25	8.69	31.25	31.67	156	225	Peak	HORIZONTAL
2	4960.36	26.08	54.00	-27.92	17.81	8.69	31.25	31.67	156	225	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	4959.18	24.69	54.00	-29.31	16.42	8.69	31.25	31.67	183	238	Average	VERTICAL
2	4959.96	49.13	74.00	-24.87	40.86	8.69	31.25	31.67	183	238	Peak	VERTICAL

Configurations	BR (GFSK) CH 78 / Chain 1
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Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	4959.79	49.56	74.00	-24.44	41.29	8.69	31.25	31.67	170	228	Peak	HORIZONTAL
2	4960.26	25.12	54.00	-28.88	16.85	8.69	31.25	31.67	170	228	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	4960.11	25.03	54.00	-28.97	16.76	8.69	31.25	31.67	149	215	Average
2	4960.63	49.47	74.00	-24.53	41.20	8.69	31.25	31.67	149	215	Peak

Note:

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

Emission level (dBuV/m) = 20 log Emission level (uV/m).

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

Configurations	EDR (8DPSK) CH 0 / Chain 1
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Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	4803.53	23.90	54.00	-30.10	16.25	8.33	31.07	31.75	133	207	Average	HORIZONTAL
2	4804.54	48.34	74.00	-25.66	40.69	8.33	31.07	31.75	133	207	Peak	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	4803.95	24.54	54.00	-29.46	16.89	8.33	31.07	31.75	145	212	Average	VERTICAL
2	4804.64	48.98	74.00	-25.02	41.33	8.33	31.07	31.75	145	212	Peak	VERTICAL

Configurations	EDR (8DPSK) CH 39 / Chain 1
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Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	4881.27	25.47	54.00	-28.53	17.49	8.52	31.17	31.71	156	210	Average	HORIZONTAL
2	4882.30	49.91	74.00	-24.09	41.93	8.52	31.17	31.71	156	210	Peak	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	4882.02	50.03	74.00	-23.97	42.05	8.52	31.17	31.71	156	221	Peak	VERTICAL
2	4882.12	25.59	54.00	-28.41	17.61	8.52	31.17	31.71	156	221	Average	VERTICAL

Configurations	EDR (8DPSK) CH 78 / Chain 1
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Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	4959.20	49.55	74.00	-24.45	41.28	8.69	31.25	31.67	169	208	Peak	HORIZONTAL
2	4959.47	25.11	54.00	-28.89	16.84	8.69	31.25	31.67	169	208	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	4959.93	51.01	74.00	-22.99	42.74	8.69	31.25	31.67	191	251	Peak	VERTICAL
2	4959.99	26.57	54.00	-27.43	18.30	8.69	31.25	31.67	191	251	Average	VERTICAL

Note:

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

Emission level (dBuV/m) = 20 log Emission level (uV/m).

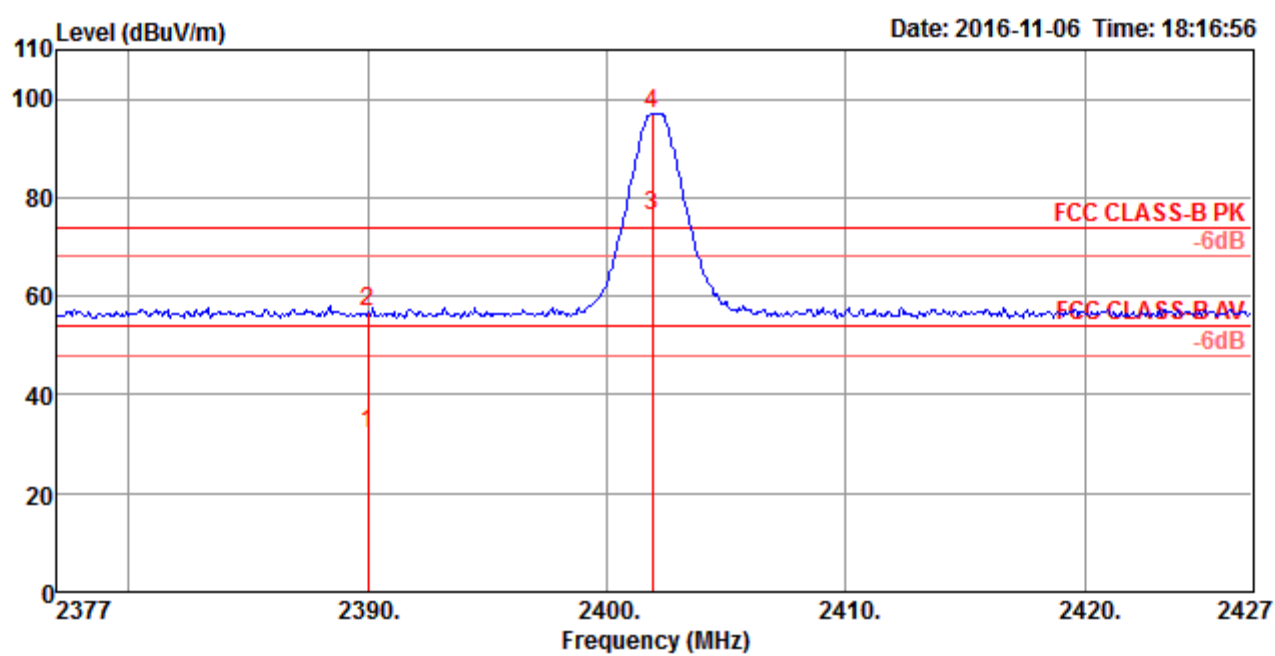
Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

Band Edge Emissions

For Test Mode: Mode 1

Configurations	BR (GFSK) CH 0, 39, 78 / Chain 1
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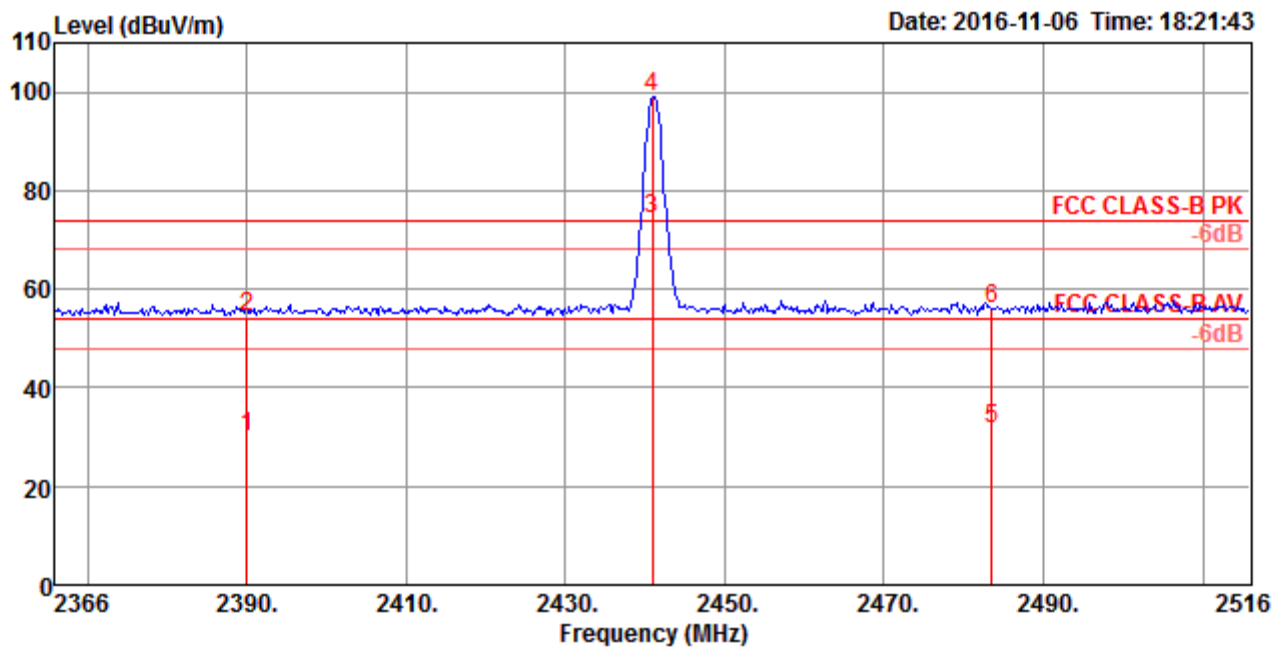
Channel 0



	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	2390.00	32.21	54.00	-21.79	-0.87	5.85	27.23	0.00	199	80 Average	VERTICAL
2	2390.00	56.65	74.00	-17.35	23.57	5.85	27.23	0.00	199	80 Peak	VERTICAL
3 •	2401.90	76.21			43.08	5.87	27.26	0.00	199	80 Average	VERTICAL
4 •	2401.90	97.05			63.92	5.87	27.26	0.00	199	80 Peak	VERTICAL

Item 3, 4 are the fundamental frequency at 2402 MHz.

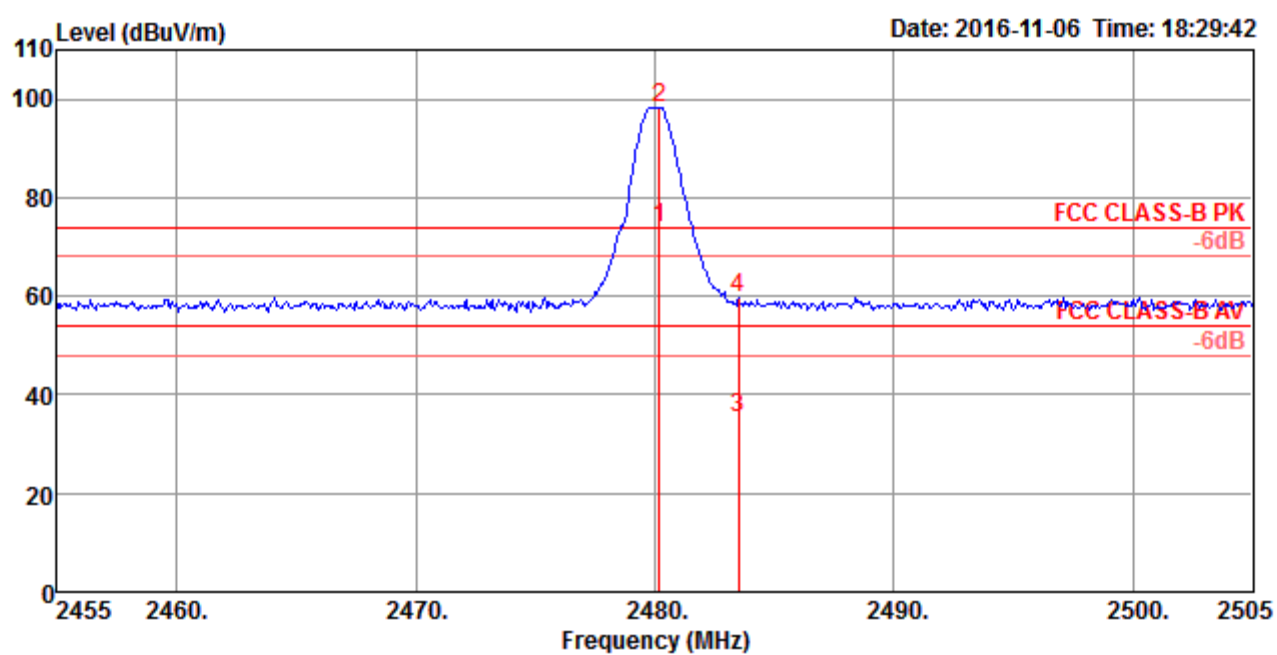
Channel 39



	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	Line	Limit	Level	Loss	Factor	Factor	cm	deg	
1	2390.00	29.90	54.00	-24.10	-3.18	5.85	27.23	0.00	150	206	Average
2	2390.00	54.34	74.00	-19.66	21.26	5.85	27.23	0.00	150	206	Peak
3	2441.00	74.41	54.00			5.92	27.36	0.00	150	206	Average
4	2441.00	98.85	74.00			5.92	27.36	0.00	150	206	Peak
5	2483.50	31.49	54.00	-22.51	-1.96	5.98	27.47	0.00	150	206	Average
6	2483.50	55.93	74.00	-18.07	22.48	5.98	27.47	0.00	150	206	Peak

Item 3, 4 are the fundamental frequency at 2441 MHz.

Channel 78



	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	Line	Limit	Level	Loss	Factor	Factor	cm	deg	
1 •	2480.20	73.84			40.42	5.97	27.45	0.00	150	180	Average
2 •	2480.20	98.28			64.86	5.97	27.45	0.00	150	180	Peak
3	2483.50	35.24	54.00	-18.76	1.79	5.98	27.47	0.00	150	180	Average
4	2483.50	59.68	74.00	-14.32	26.23	5.98	27.47	0.00	150	180	Peak

Item 1, 2 are the fundamental frequency at 2480 MHz.

Note:

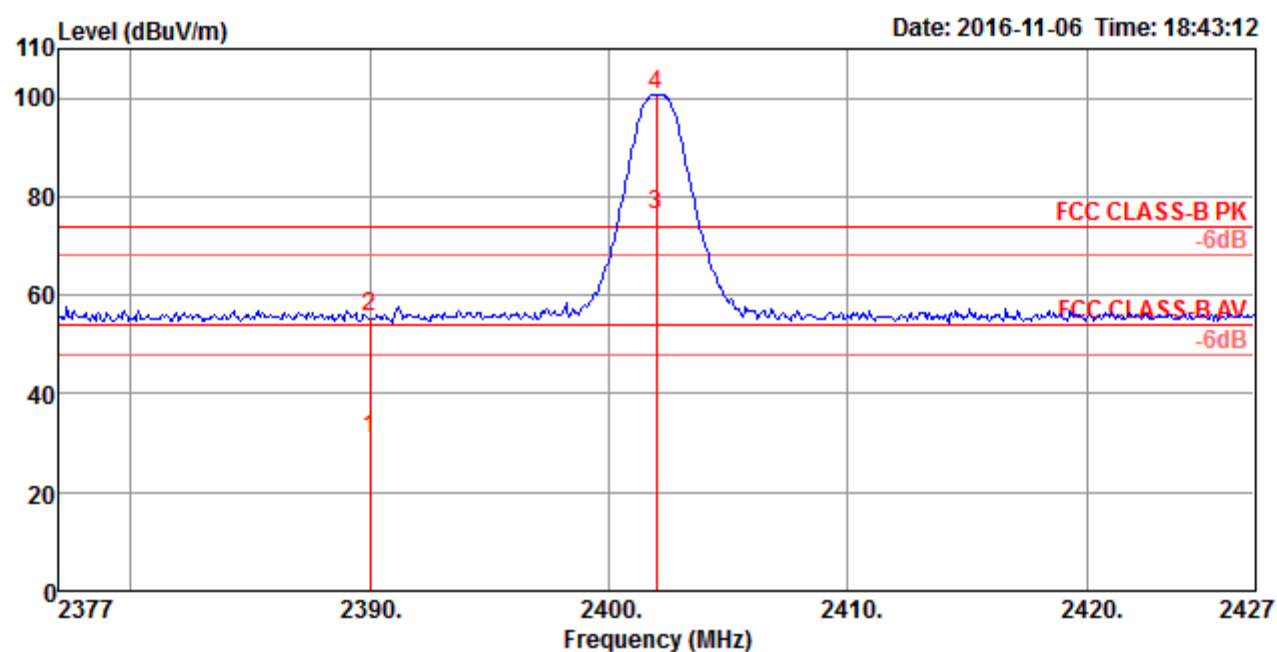
Emission level (dBuV/m) = 20 log Emission level (uV/m).

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

Configurations

EDR (8DPSK) CH 0, 39, 78 / Chain 1

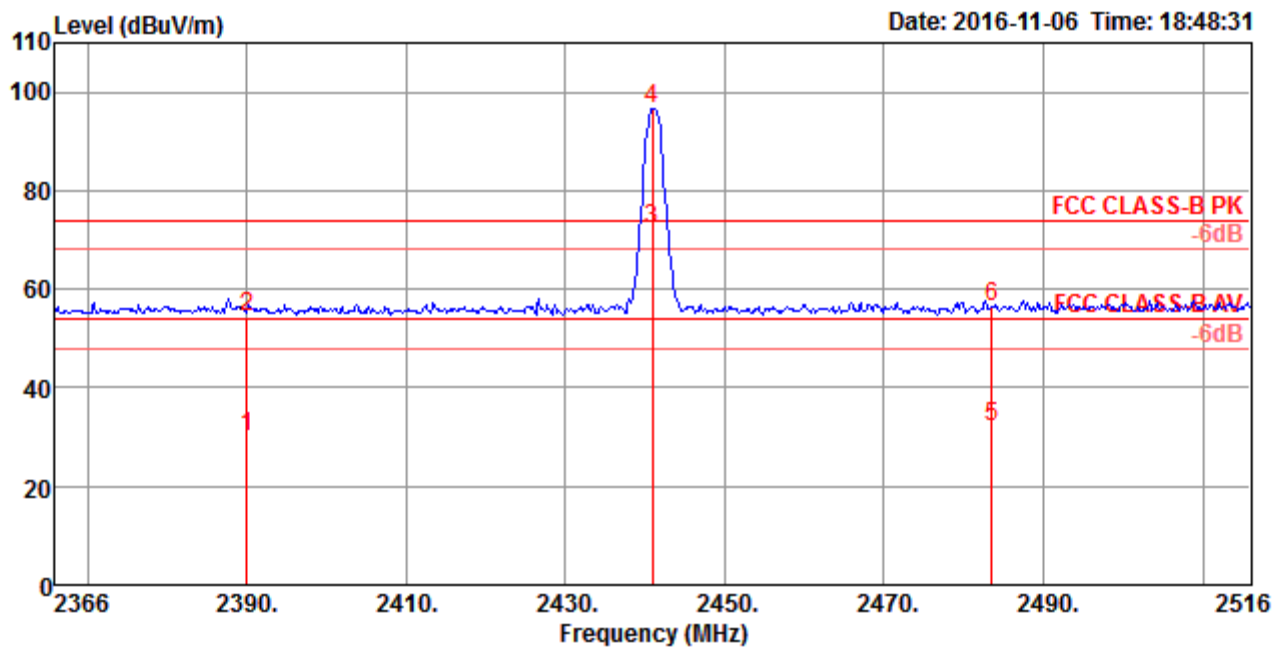
Channel 0



	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	2390.00	31.00	54.00	-23.00	-2.08	5.85	27.23	0.00	150	199 Average	HORIZONTAL
2	2390.00	55.44	74.00	-18.56	22.36	5.85	27.23	0.00	150	199 Peak	HORIZONTAL
3 •	2402.00	76.19			43.06	5.87	27.26	0.00	150	199 Average	HORIZONTAL
4 •	2402.00	100.63			67.50	5.87	27.26	0.00	150	199 Peak	HORIZONTAL

Item 3, 4 are the fundamental frequency at 2402 MHz.

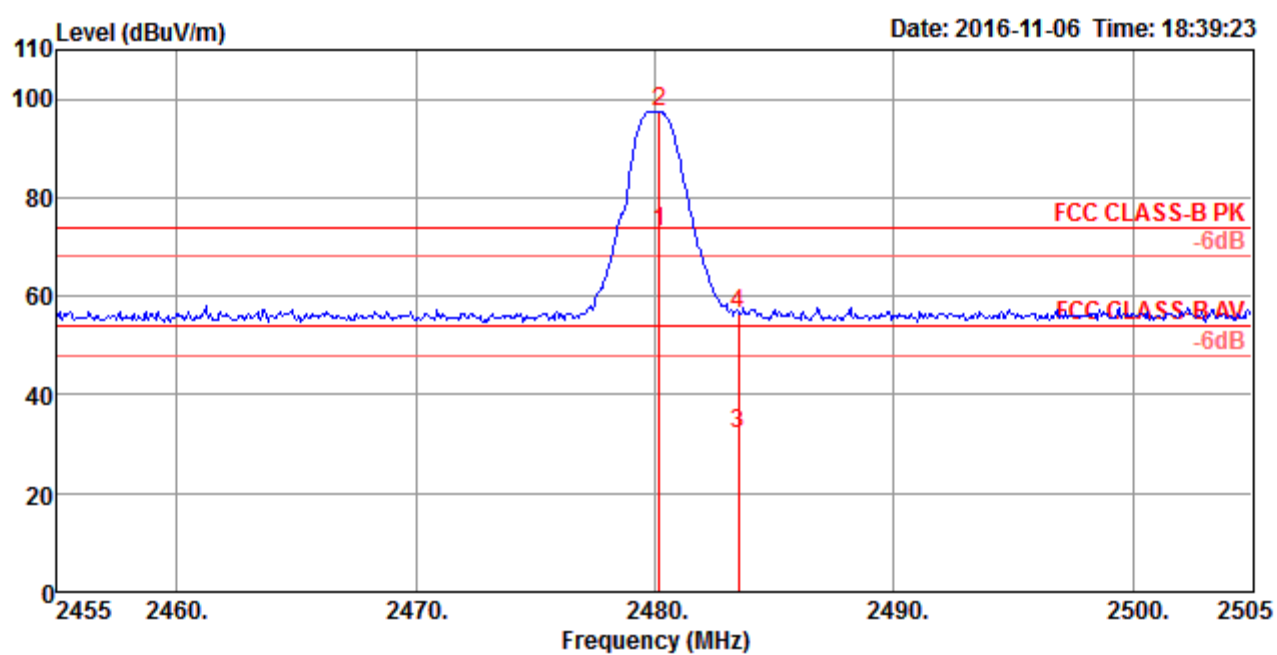
Channel 39



	Freq	Level	Limit	Over	Read	CableAntenna	Preampl	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	Line	Limit	Level	Loss	Factor	Factor	cm	deg	
1	2390.00	29.98	54.00	-24.02	-3.10	5.85	27.23	0.00	196	95 Average	VERTICAL
2	2390.00	54.42	74.00	-19.58	21.34	5.85	27.23	0.00	196	95 Peak	VERTICAL
3	2441.00	72.27			38.99	5.92	27.36	0.00	196	95 Average	VERTICAL
4	2441.00	96.71			63.43	5.92	27.36	0.00	196	95 Peak	VERTICAL
5	2483.50	31.95	54.00	-22.05	-1.50	5.98	27.47	0.00	196	95 Average	VERTICAL
6	2483.50	56.39	74.00	-17.61	22.94	5.98	27.47	0.00	196	95 Peak	VERTICAL

Item 3, 4 are the fundamental frequency at 2441 MHz.

Channel 78



	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	Line	Limit	Level	Loss	Factor	Factor	cm	deg	
1 •	2480.20	73.12			39.70	5.97	27.45	0.00	150	200 Average	HORIZONTAL
2 •	2480.20	97.56			64.14	5.97	27.45	0.00	150	200 Peak	HORIZONTAL
3	2483.50	32.14	54.00	-21.86	-1.31	5.98	27.47	0.00	150	200 Average	HORIZONTAL
4	2483.50	56.58	74.00	-17.42	23.13	5.98	27.47	0.00	150	200 Peak	HORIZONTAL

Item 1, 2 are the fundamental frequency at 2480 MHz.

Note:

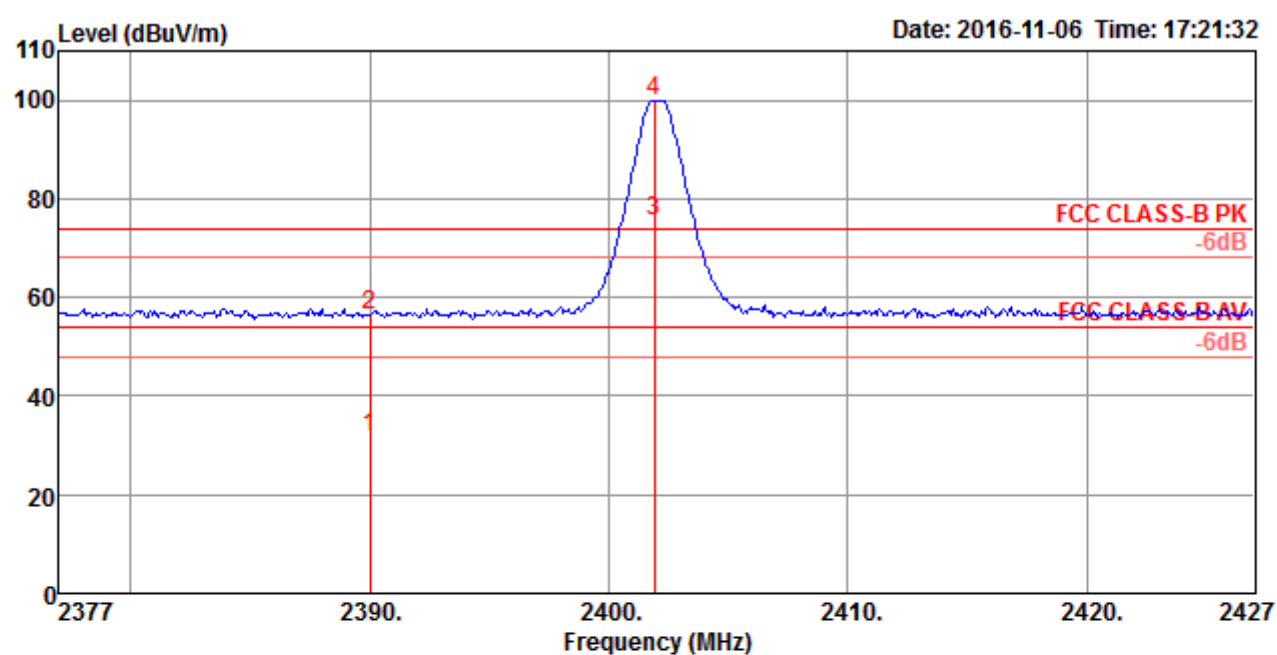
Emission level (dBuV/m) = 20 log Emission level (uV/m).

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

For Test Mode: Mode 2

Configurations	BR (GFSK) CH 0, 39, 78 / Chain 1
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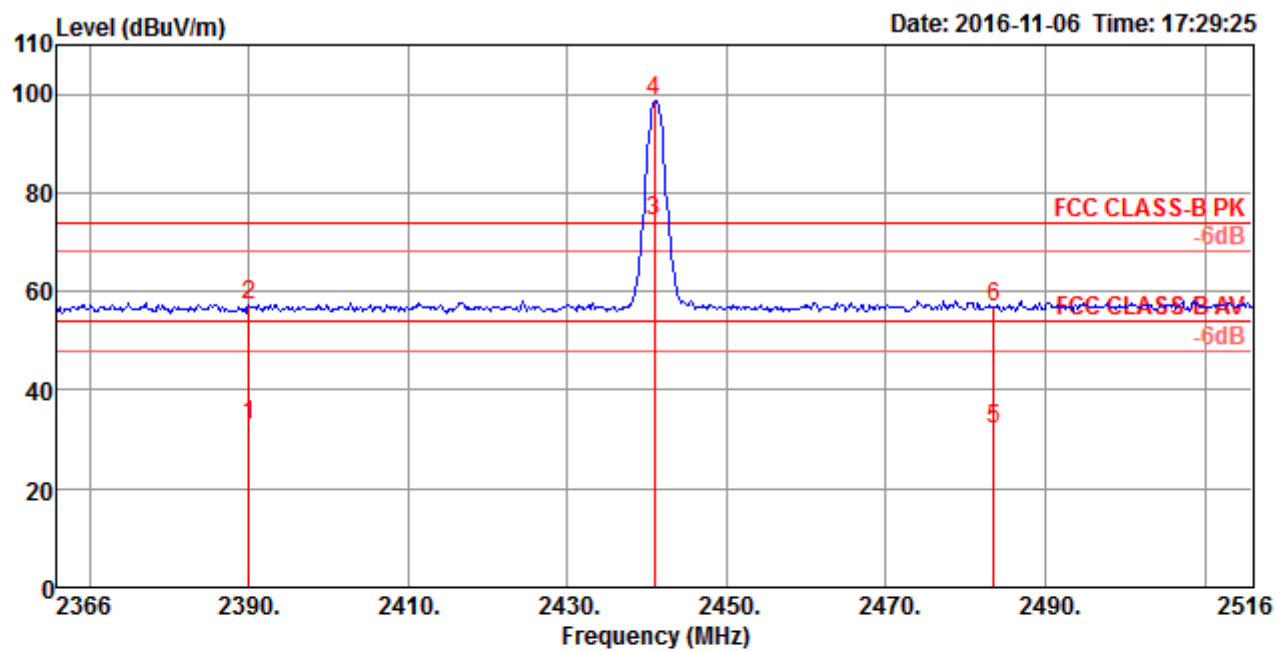
Channel 0



	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamplifier Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	2390.00	31.84	54.00	-22.16	-1.24	5.85	27.23	0.00	100	36 Average	VERTICAL
2	2390.00	56.28	74.00	-17.72	23.20	5.85	27.23	0.00	100	36 Peak	VERTICAL
3	2401.90	75.57			42.44	5.87	27.26	0.00	100	36 Average	VERTICAL
4	2401.90	99.94			66.81	5.87	27.26	0.00	100	36 Peak	VERTICAL

Item 3, 4 are the fundamental frequency at 2402 MHz.

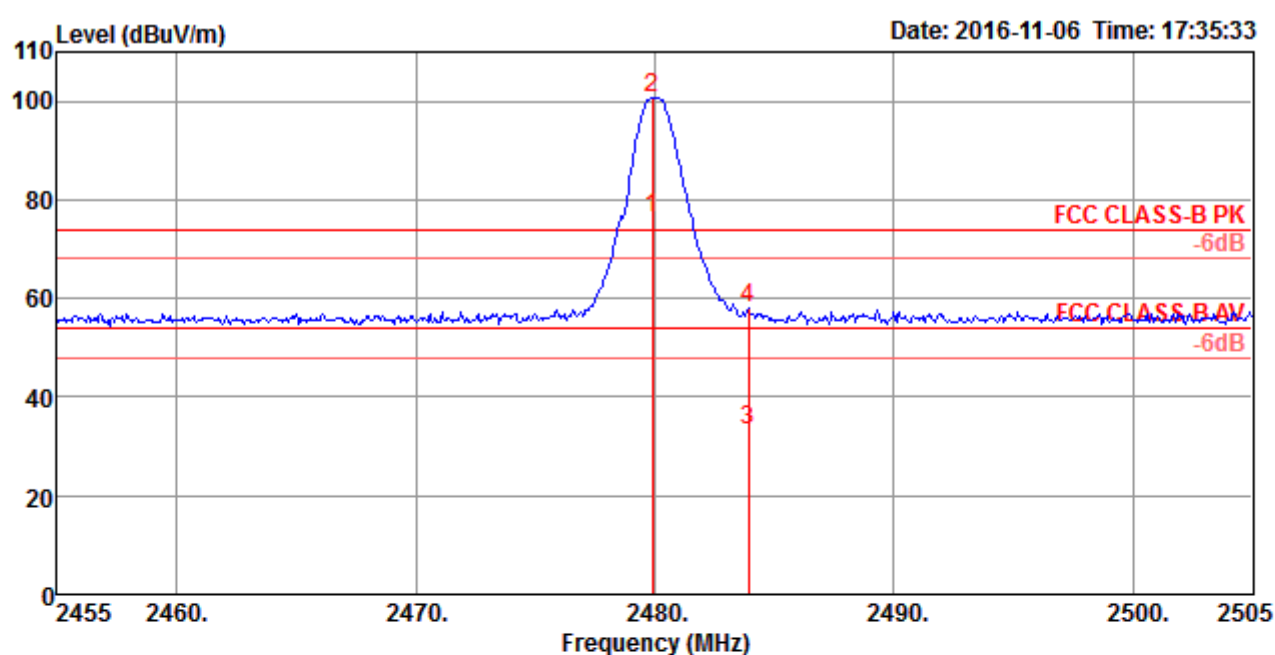
Channel 39



	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	2390.00	32.73	54.00	-21.27	-0.35	5.85	27.23	0.00	100	66 Average	VERTICAL
2	2390.00	57.17	74.00	-16.83	24.09	5.85	27.23	0.00	100	66 Peak	VERTICAL
3	2441.00	74.12			40.84	5.92	27.36	0.00	100	66 Average	VERTICAL
4	2441.00	98.56			65.28	5.92	27.36	0.00	100	66 Peak	VERTICAL
5	2483.50	32.19	54.00	-21.81	-1.26	5.98	27.47	0.00	100	66 Average	VERTICAL
6	2483.50	56.63	74.00	-17.37	23.18	5.98	27.47	0.00	100	66 Peak	VERTICAL

Item 3, 4 are the fundamental frequency at 2441 MHz.

Channel 78



	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1 •	2479.90	76.11			42.69	5.97	27.45	0.00	100	7 Average	VERTICAL
2 •	2479.90	100.55			67.13	5.97	27.45	0.00	100	7 Peak	VERTICAL
3	2483.90	33.41	54.00	-20.59	-0.04	5.98	27.47	0.00	100	7 Average	VERTICAL
4	2483.90	57.85	74.00	-16.15	24.40	5.98	27.47	0.00	100	7 Peak	VERTICAL

Item 1, 2 are the fundamental frequency at 2480 MHz.

Note:

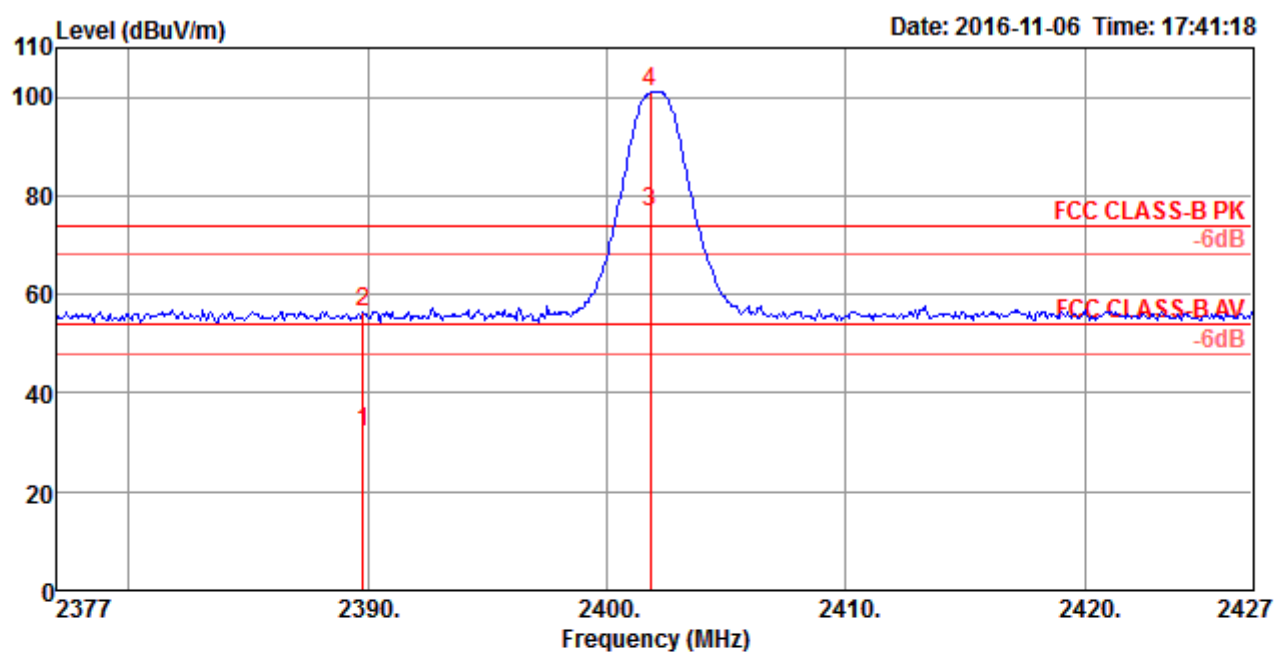
Emission level (dBuV/m) = 20 log Emission level (uV/m).

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

Configurations

EDR (8DPSK) CH 0, 39, 78 / Chain 1

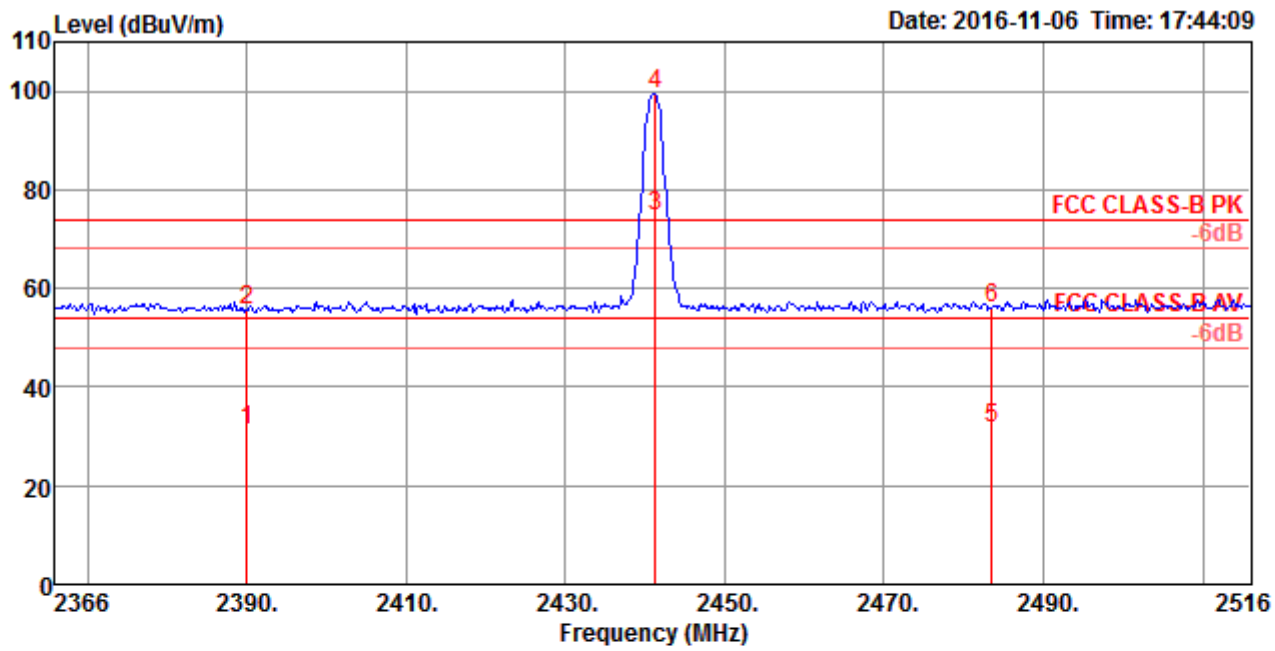
Channel 0



	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamplifier Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	2389.80	31.97	54.00	-22.03	-1.11	5.85	27.23	0.00	100	39 Average	VERTICAL
2	2389.80	56.40	74.00	-17.60	23.32	5.85	27.23	0.00	100	39 Peak	VERTICAL
3	2401.80	76.58			43.45	5.87	27.26	0.00	100	39 Average	VERTICAL
4	2401.80	101.02			67.89	5.87	27.26	0.00	100	39 Peak	VERTICAL

Item 3, 4 are the fundamental frequency at 2402 MHz.

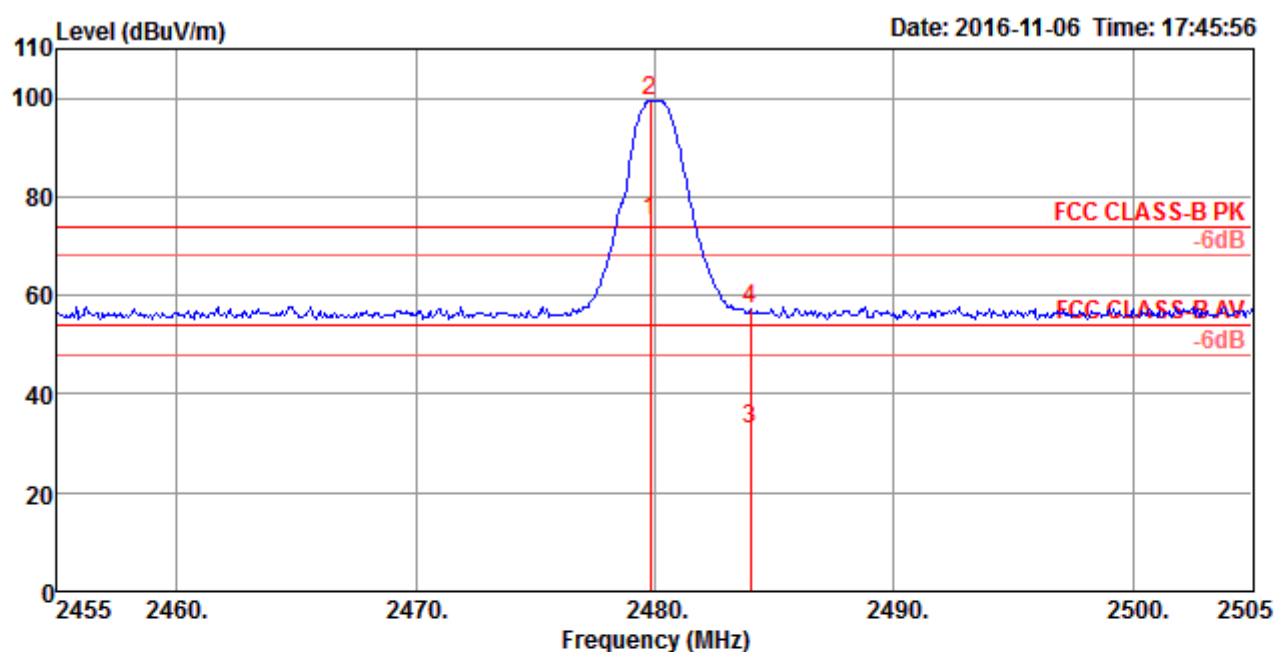
Channel 39



	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	2390.00	31.24	54.00	-22.76	-1.84	5.85	27.23	0.00	100	66 Average	VERTICAL
2	2390.00	55.68	74.00	-18.32	22.60	5.85	27.23	0.00	100	66 Peak	VERTICAL
3	2441.30	74.82			41.54	5.92	27.36	0.00	100	66 Average	VERTICAL
4	2441.30	99.26			65.98	5.92	27.36	0.00	100	66 Peak	VERTICAL
5	2483.50	31.55	54.00	-22.45	-1.90	5.98	27.47	0.00	100	66 Average	VERTICAL
6	2483.50	55.99	74.00	-18.01	22.54	5.98	27.47	0.00	100	66 Peak	VERTICAL

Item 3, 4 are the fundamental frequency at 2441 MHz.

Channel 78



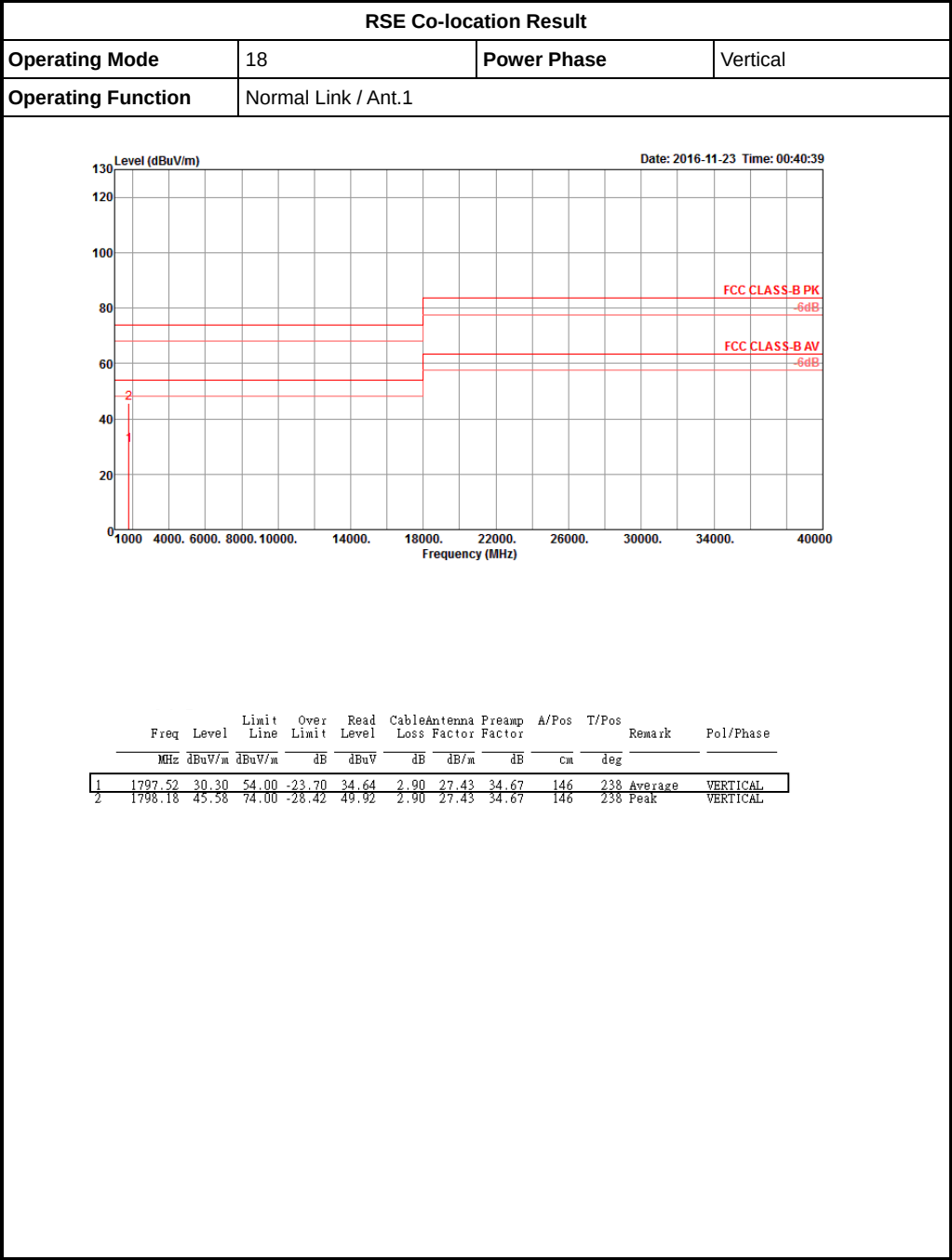
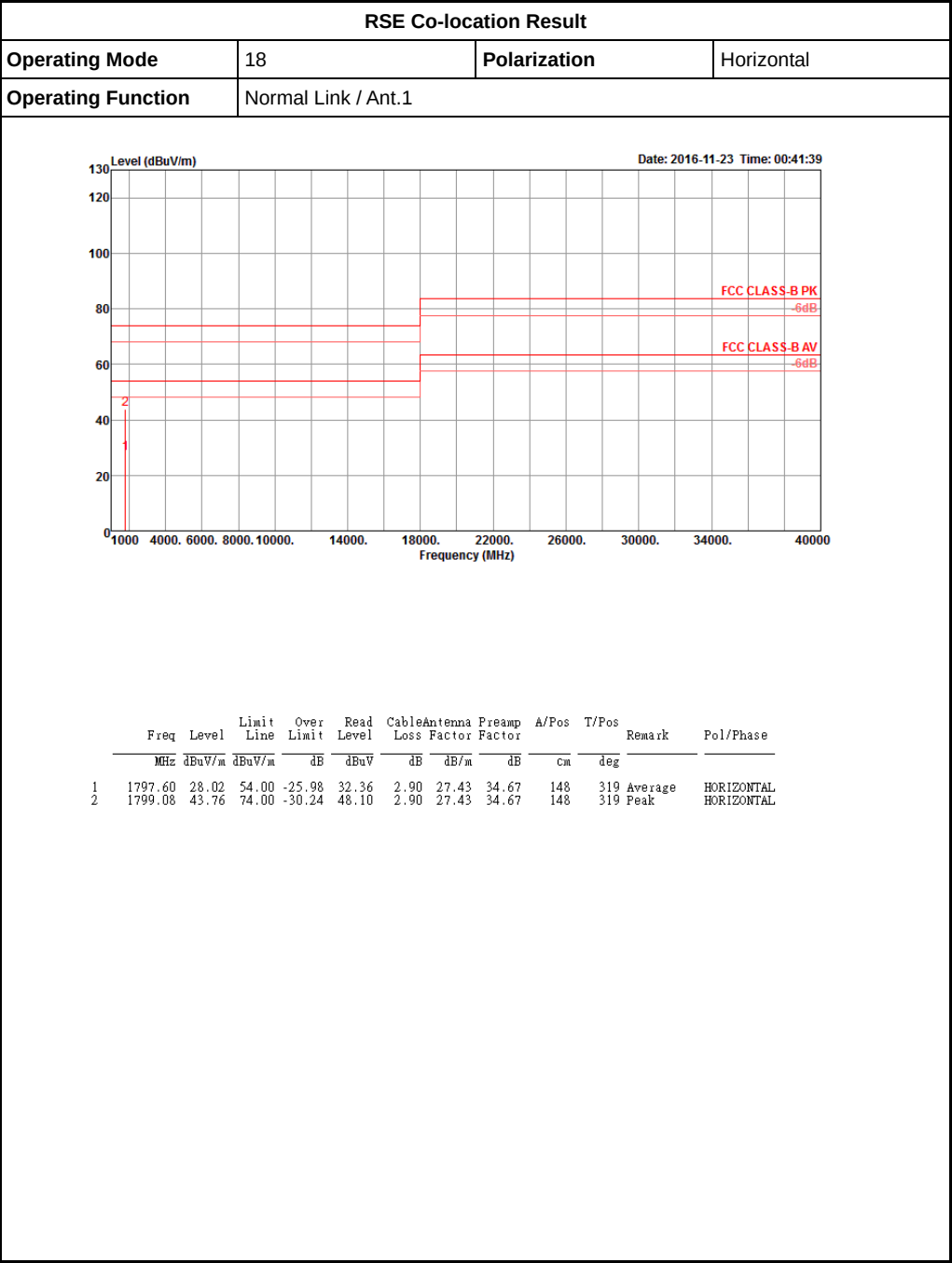
	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1 •	2479.80	75.00			41.58	5.97	27.45	0.00	100	40	Average	VERTICAL
2 •	2479.80	99.44			66.02	5.97	27.45	0.00	100	40	Peak	VERTICAL
3	2484.00	32.80	54.00	-21.20	-0.65	5.98	27.47	0.00	100	40	Average	VERTICAL
4	2484.00	57.24	74.00	-16.76	23.79	5.98	27.47	0.00	100	40	Peak	VERTICAL

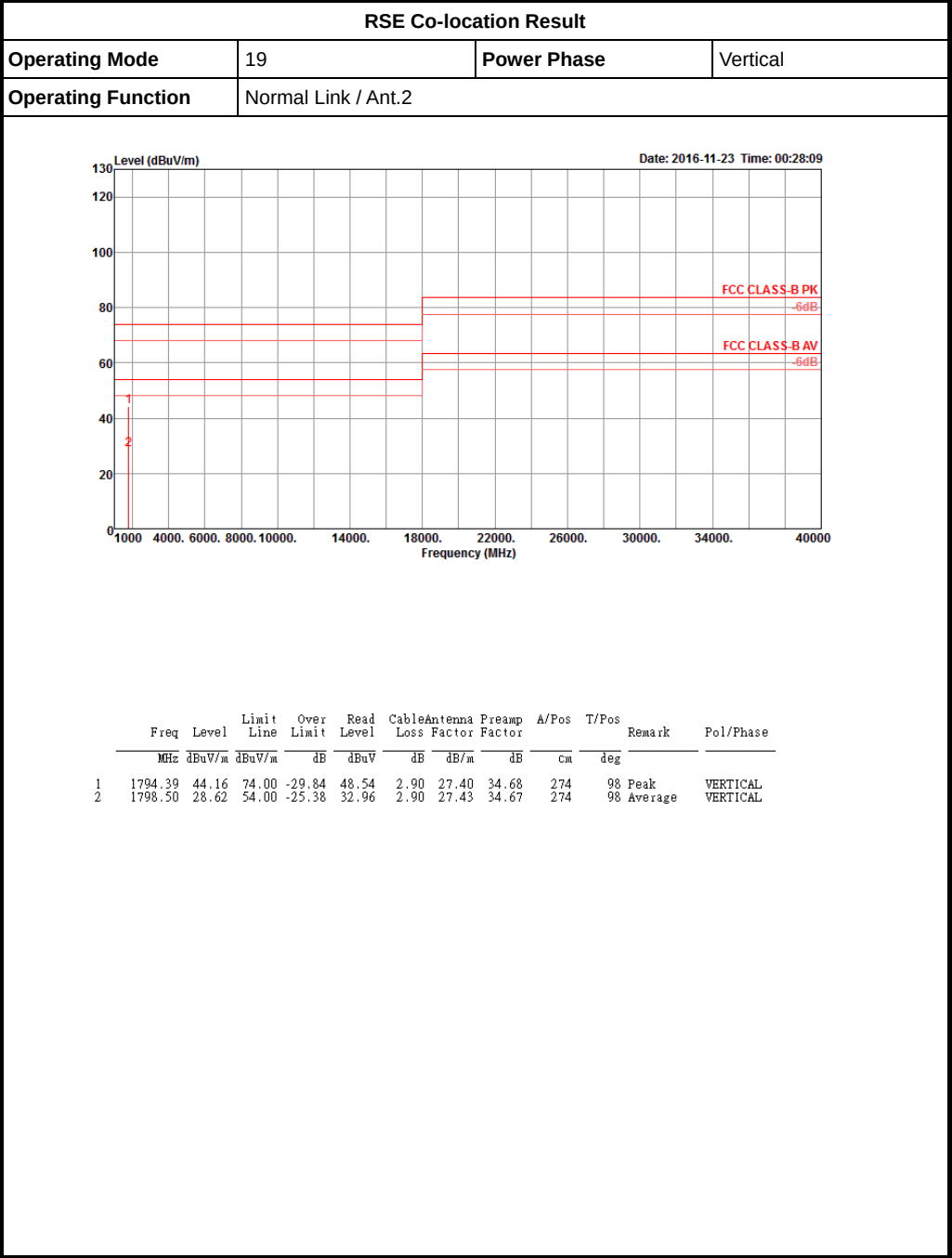
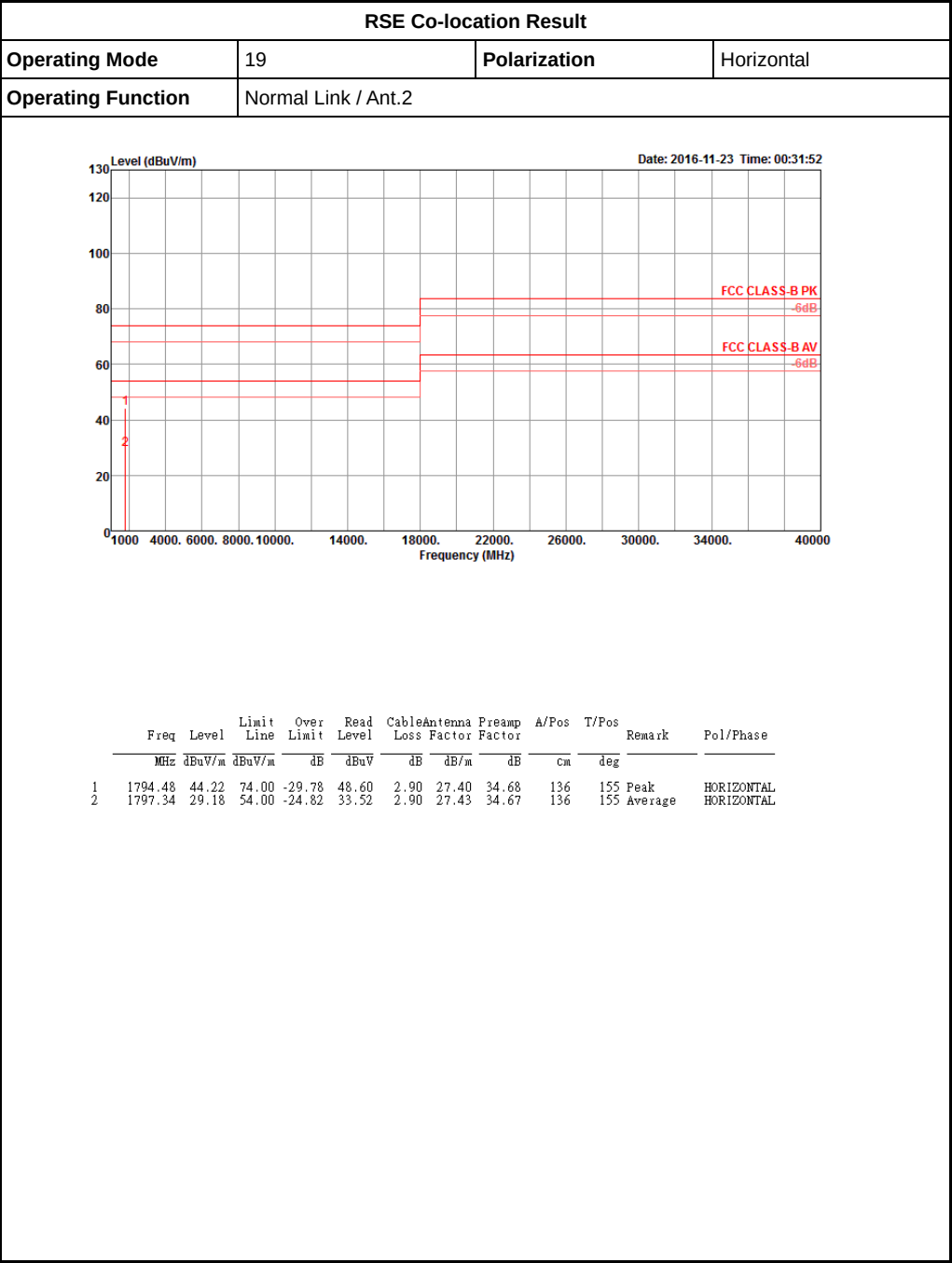
Item 1, 2 are the fundamental frequency at 2480 MHz.

Note:

Emission level (dBuV/m) = 20 log Emission level (uV/m).

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.





1. Photographs of Conducted Emissions Test Configuration

Test Mode: Mode 1

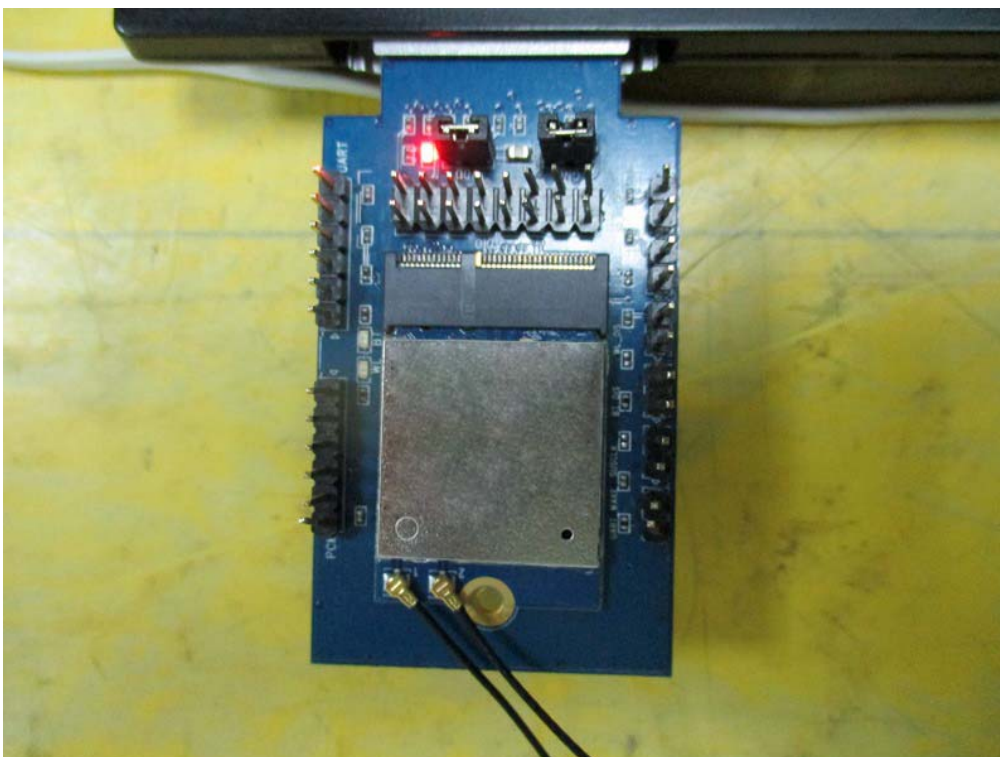
FRONT VIEW



REAR VIEW



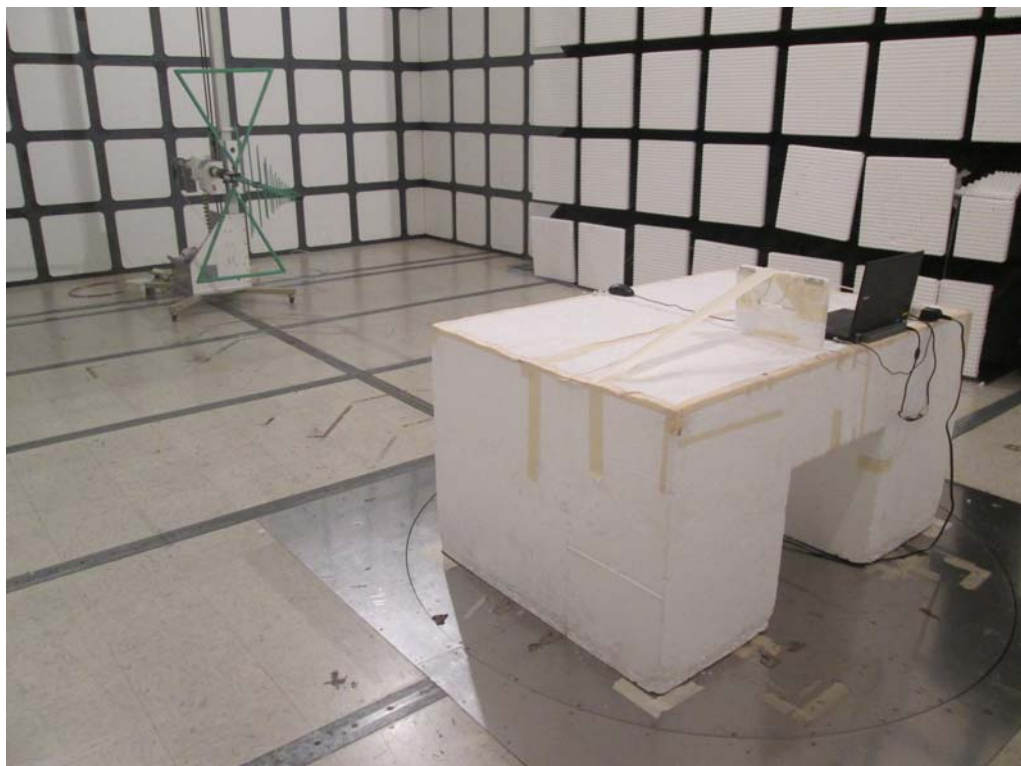
CLOSE-UP VIEW



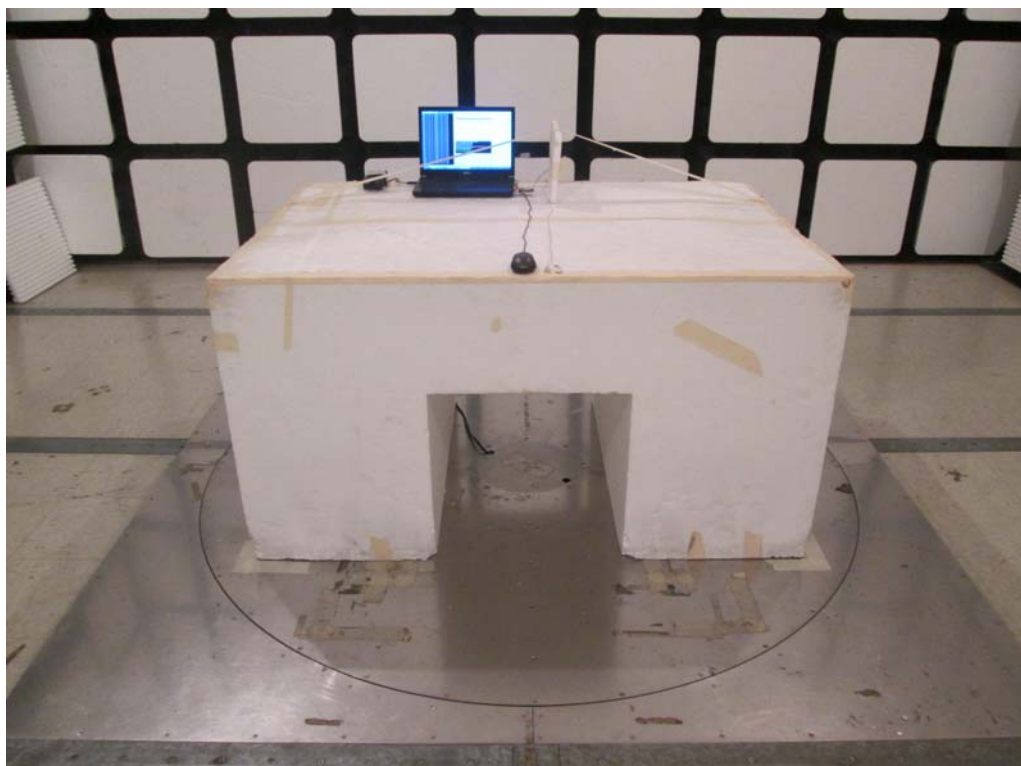
2. Photographs of Radiated Emissions Test Configuration

Test Configuration: 30MHz~1GHz / Test Mode: Mode 3

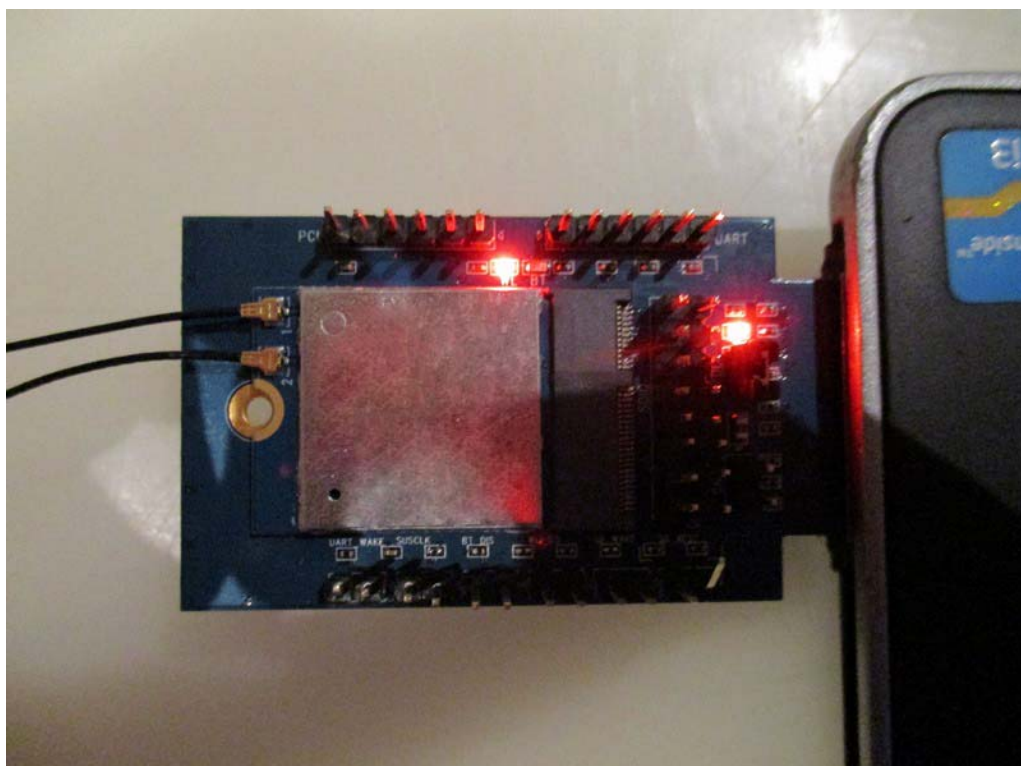
FRONT VIEW



REAR VIEW

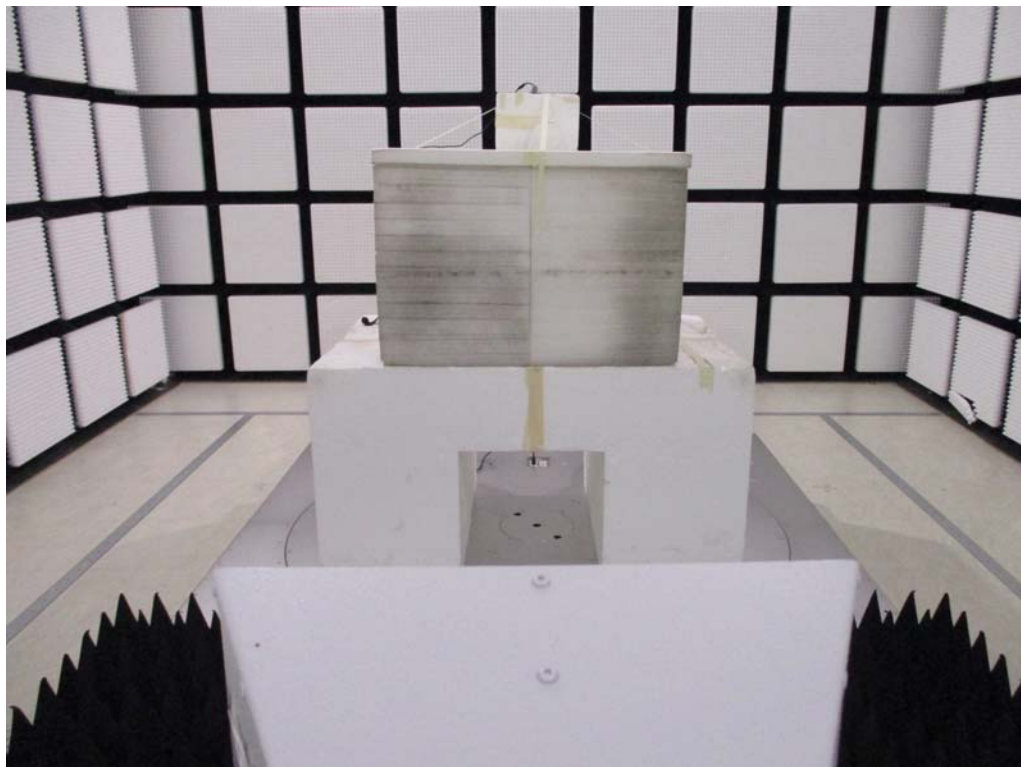


CLOSE-UP VIEW

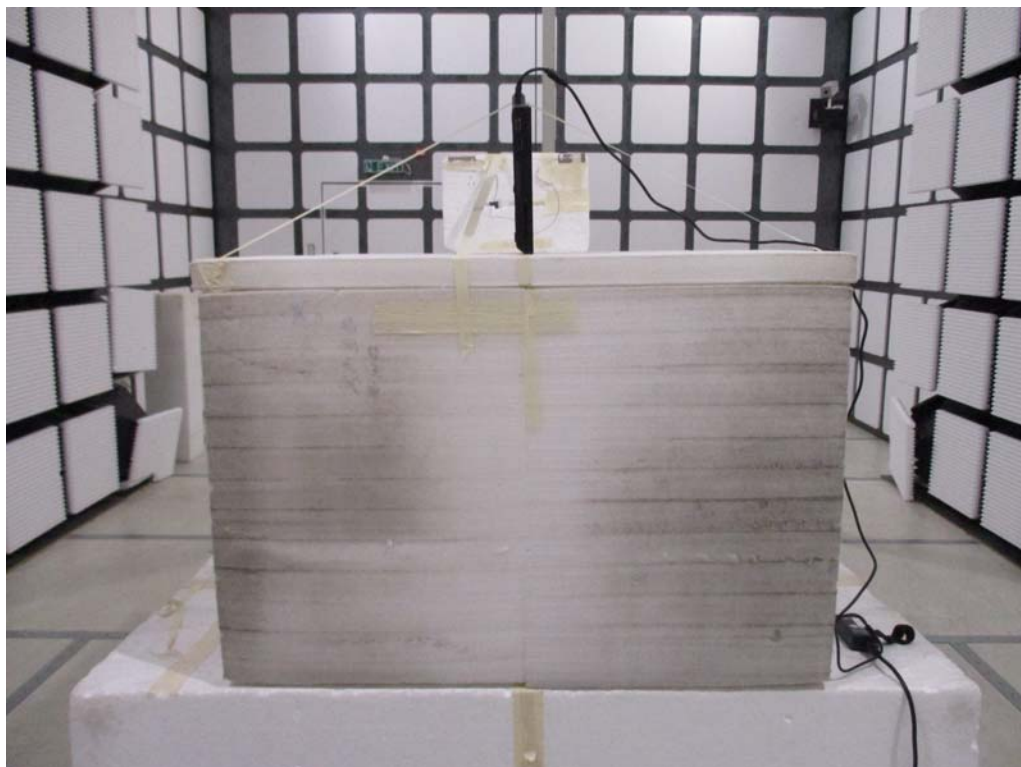




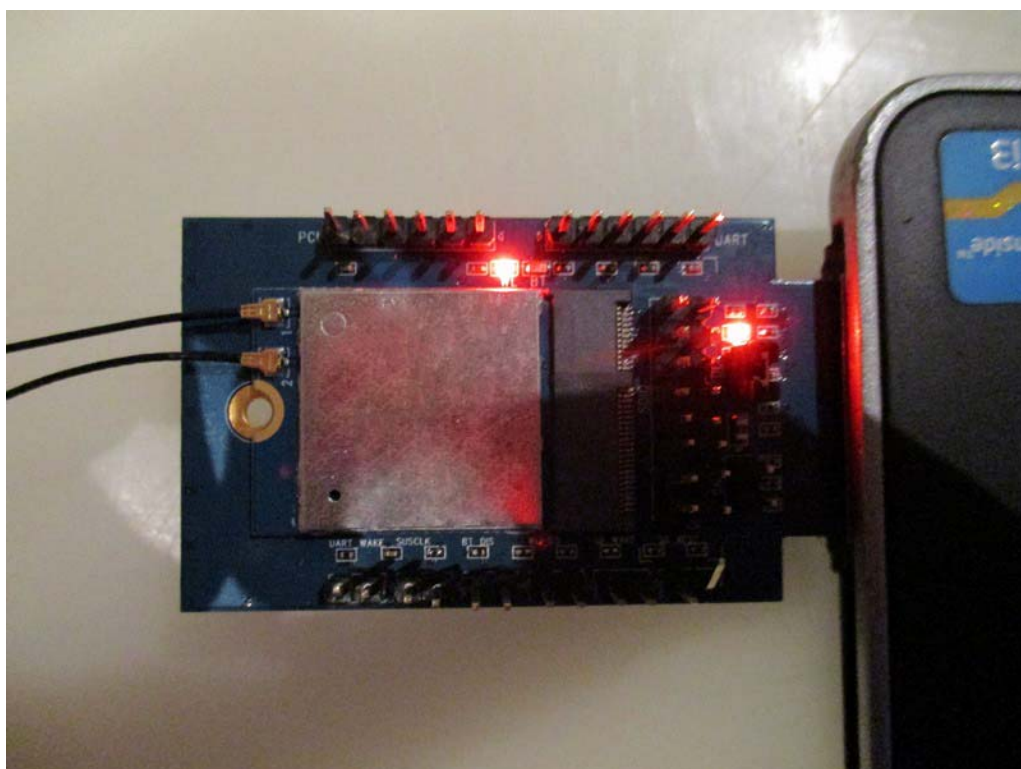
FRONT VIEW



REAR VIEW

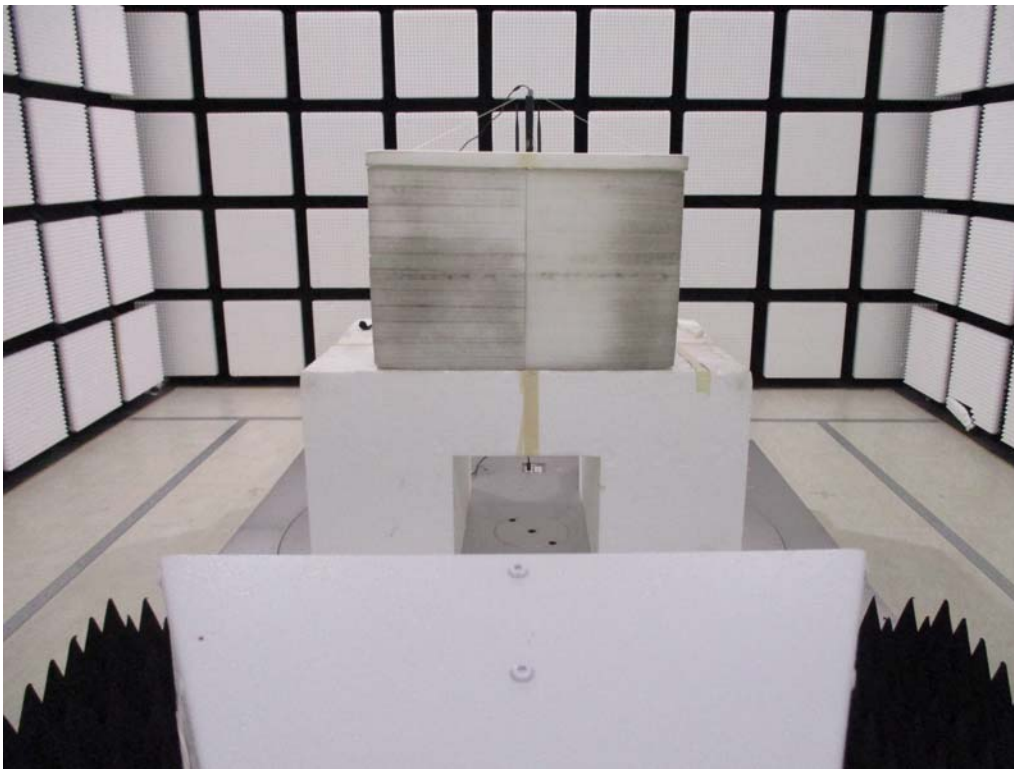


CLOSE-UP VIEW

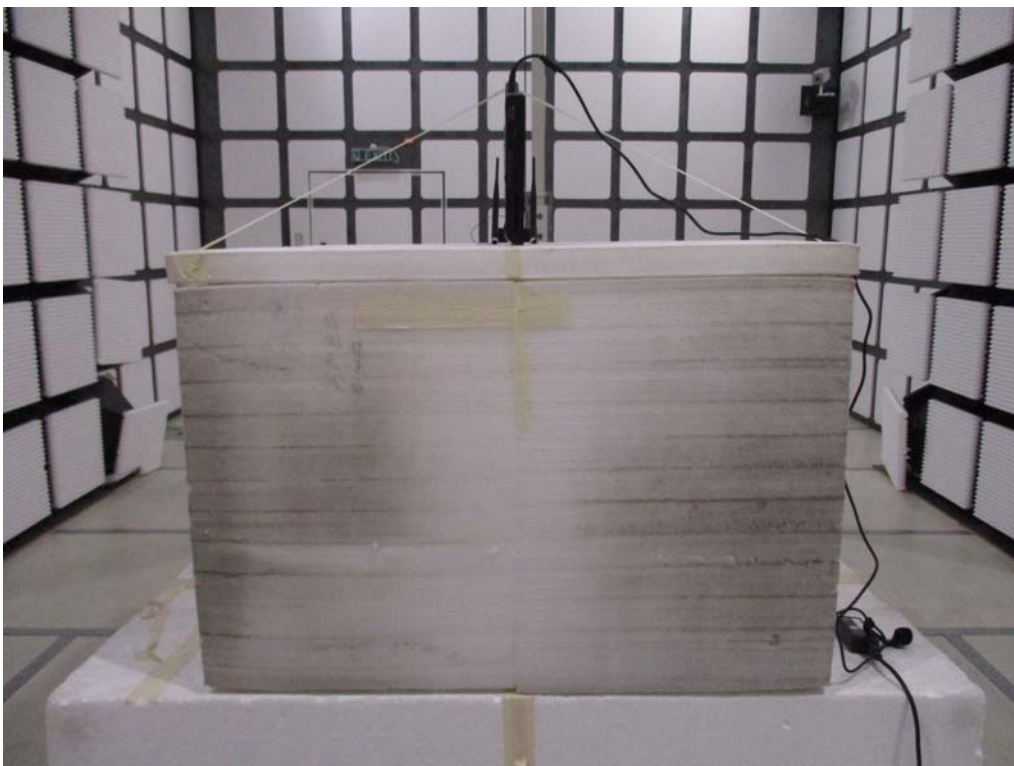


Test Mode: Mode 2

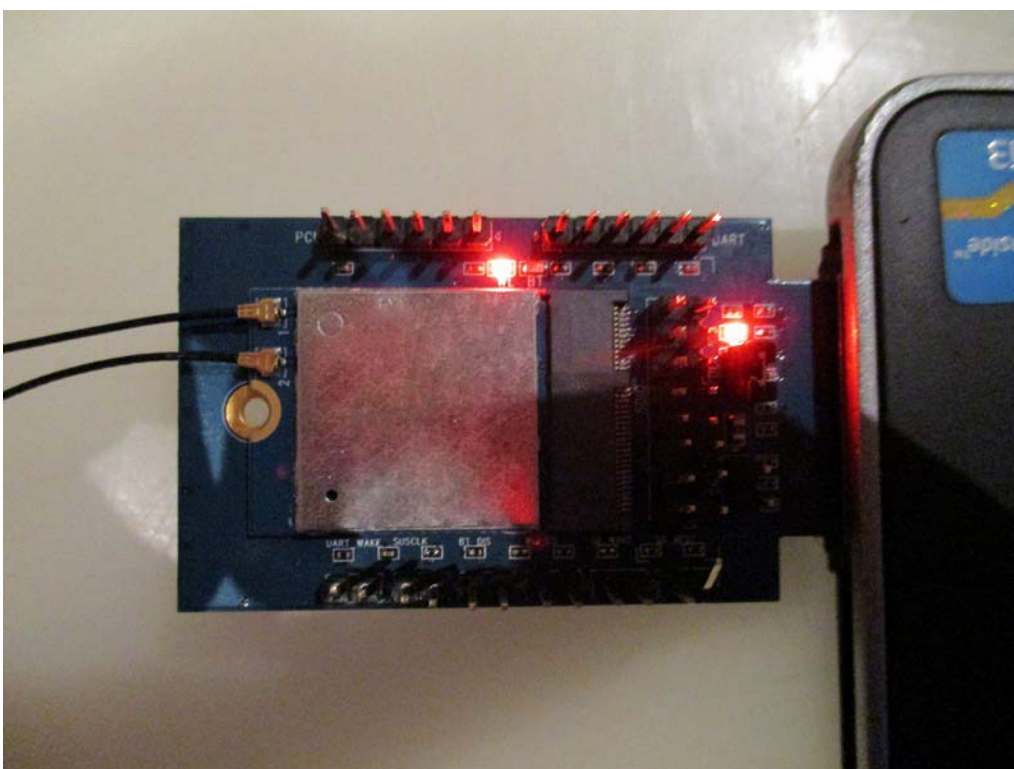
FRONT VIEW



REAR VIEW



CLOSE-UP VIEW



Appendix J. Antenna List

1. Table for Filed Antenna

No.	Brand	Ant. Type	Con. Type	Peak Gain (dBi)		Model No.
				2.4GHz	5GHz	
01	LYNwave	PIFA	IPEX	3.5	5	ALA110-222050-300011
02	Walsin	DIPOLE	IPEX	3.14	5	RFDPA171320EMLB301
03	HONGLIN	PIFA	IPEX	1.58	1.21	DC33001FH00
04	LUXSHARE-ICT	PIFA	IPEX	-0.5	0.5	DC33001FC00
05	SPEEDWIRE	PIFA	IPEX	-0.97	1.93	DC33001FG00
06	HONGLIN	PIFA	IPEX	-0.78	-2.39	DC33001FF00
07	LUXSHARE-ICT	PIFA	IPEX	-0.3	-0.3	DC33001FD00
08	SPEEDWIRE	PIFA	IPEX	-0.98	2.78	DC33001FE00
09	Tongda	PIFA	IPEX	TX1: 0.02 TX2: -0.46	-0.20 -0.93	TX1: T-543-9021099-A TX2: T-543-9021099-A
10	LUXSHAR E-ICT	PIFA	IPEX	TX1: -3.90 TX2: -1.70	-1.20 -2.90	TX1: DC33001FY20 TX2: DC33001FY30
11	LUXSHAR E-ICT	PIFA	IPEX	TX1: -1.80 TX2: -1.40	-0.90 -2.50	TX1: DC33001FY00 TX2: DC33001FY10
12	LUXSHAR E-ICT	PIFA	IPEX	TX1: -3.30 TX2: -2.20	-1.30 -2.60	TX1: DC33001G000 TX2: DC33001G010
13	LUXSHAR E-ICT	PIFA	IPEX	TX1: -1.60 TX2: -1.30	-1.90 -0.90	TX1: DC33001G020 TX2: DC33001G030
14	LUXSHAR E-ICT	PIFA	IPEX	TX1: -5.10 TX2: -1.30	-3.10 -0.80	TX1: DC33001G310 TX2: DC33001G300
15	Smart Approach	PIFA	IPEX	TX1: 0.60 TX2: 0.32	0.43 2.15	TX1: SE-EQFFG-006 TX2: SE-EQFFG-006
16	Foxconn	PIFA	IPEX	TX1: 0.54 TX2: 1.43	0.64 2.20	TX1: ANTP2M1-CQA23-EH TX2: ANTP2M1-CQA23-EH
17	Foxconn	PIFA	IPEX	TX1: 0.15 TX2: 1.13	-0.30 -0.64	TX1: ANTP2M1-CQA22-EH TX2: ANTP2M1-CQA22-EH
18	INPAQ	PIFA	IPEX	TX1: 0.88 TX2: 0.51	3.05 2.57	TX1: DQ60PLBLB12 TX2: DQ60PLBLB12
19	LUXSHAR E-ICT	PIFA	IPEX	TX1: -4.50 TX2: -3.40	-0.50 -0.80	TX1: DC33001G320 TX2: DC33001G330
20	Smart Approach	PIFA	IPEX	TX1: -0.29 TX2: 0.46	1.02 1.12	TX1: SE-EQFFG-005 TX2: SE-EQFFG-005

21	INNOWAVE	PIFA	IPEX	TX1: 2.82 TX2: 2.72	2.08 2.96	TX1: S79-1805520-I73 TX2: S79-1805510-I73
22	Speedwire	PIFA	IPEX	TX1: -0.03 TX2: -1.31	-0.58 -0.03	TX1: DC33001G210 TX2: DC33001G200
23	Speedwire	PIFA	IPEX	TX1: -1.88 TX2: -4.51	-0.59 -0.33	TX1: DC33001FZ00 TX2: DC33001FZ10
24	Speedwire	PIFA	IPEX	TX1: -1.55 TX2: -3.99	0.38 1.78	TX1: DC33001FZ20 TX2: DC33001FZ30
25	Speedwire	PIFA	IPEX	TX1: -1.41 TX2: -2.16	0.09 0.13	TX1: DC33001G120 TX2: DC33001G130
26	Speedwire	PIFA	IPEX	TX1: -1.27 TX2: -2.02	0.08 0.42	TX1: DC33001G100 TX2: DC33001G110
27	Speedwire	PIFA	IPEX	TX1: -1.13 TX2: -0.17	-1.95 -0.52	TX1: DC33001G220 TX2: DC33001G230
28	High-Tek	PIFA	IPEX	TX1: 1.01 TX2: -1.19	2.90 1.06	TX1: DC33001RM00 TX2: DC33001RM10
29	Tongda	PIFA	IPEX	TX1: -2.05 TX2: -1.08	1.44 1.00	TX1: DC33001RN00 TX2: DC33001RN10
30	High-Tek	PIFA	IPEX	TX1: -0.86 TX2: -2.59	0.63 -0.21	TX1: 0ACCN014021N TX2: 0ACCN014021N
31	Smart Approach	PIFA	IPEX	TX1: 0.38 TX2: 1.43	0.73 2.91	TX1: SE-ECAL1-001 TX2: SE-ECAL1-001
32	LUXSHARE-ICT	PIFA	IPEX	TX1: -3.60 TX2: -2.00	-0.60 -2.90	TX1: LA22RF826-1H TX2: LA22RF825-1H
33	Speed	PIFA	IPEX	TX1: -1.46 TX2: -1.59	0.14 2.39	TX1: F.0G.JV-0048-003-00 TX2: F.0G.JV-0048-004-00
34	Amphenol	PIFA	IPEX	TX1: 1.68 TX2: 0.18	-0.71 -1.71	TX1: 6717-FA TX2: 6719-FB
35	Speed	PIFA	IPEX	TX1: 1.50 TX2: -0.12	0.38 -0.14	TX1: M.Z2.ZV-0001-001 TX2: M.Z2.ZV-0001-002
36	LUXSHARE-ICT	PIFA	IPEX	TX1: -1.40 TX2: -3.60	-0.20 -2.80	TX1: 025.900KY.0001 TX2: 025.900KZ.0001
37	WNC	PIFA	IPEX	TX1: -0.89 TX2: 0.38	0.63 -1.41	TX1: 025.900KY.0001 TX2: 025.900KZ.0001
38	Jieng-Tai	PIFA	IPEX	TX1: 1.93 TX2: 0.15	1.23 1.39	TX1: 7KYQUTAN000372 TX2: 7KYQUTAN000372

39	TONGDA	PIFA	IPEX	TX1: 0.76 TX2: 0.66	0.75 0.85	TX1: T-543-9051117-B TX2: T-543-9051117-B
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