FCC / IC Test Report

FOR:
FIO Corporation

Model Name:
Deki Reader V200

Product Description:
Portable camera-based diagnostic device

FCC ID: 2ANVA-V200
IC ID: 22342-V200

Applied Rules and Standards:
47 CFR Part 15.247
RSS-247 Issue 2 & RSS-Gen Issue 4

REPORT #: EMC_FIOIN-002-17001_FCC_15.247_BT

DATE: 11/10/2017

A2LA Accredited

IC recognized # 3462B-2

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1 Assessment

The following device was evaluated radiated spurious emission against the applicable criteria specified in FCC rules Parts 15.247 of Title 47 of the Code of Federal Regulations and the relevant ISED Canada standard RSS-247. No deviations were ascertained.

Transceiver module Tiwi-BLE (FCC ID: TFB-TIWI-01/ IC ID: 5969A-TIWI101) is used in this device as client declared.

Company	Description	Model #
FIO Corporation	Portable diagnostic device	Deki Reader V200

Responsible for Testing Laboratory:

Date	Section	Name	Signature
11/10/2017	Compliance	Dr. Peter Nevermann (Director Radio Communications and EMC)	Digitally signed by peter.nevermann@cetecom.com Date: 2017.12.18 22:29:10 +01'00'

Responsible for the Report:

Date	Section	Name	Signature
11/10/2017	Compliance	Cindy Li (EMC Engineer)	Digitally signed by Cindy Li DN: cn=Cindy Li, o=CETECOM Inc., ou=EMC, email=cindy.li@cetecom.com, c=US Date: 2017.11.30 12:27:51 -08'00'

2 Administrative Data

2.1 Identification of the Testing Laboratory Issuing the EMC Test Report

Company Name:	CETECOM Inc.
Department:	Compliance
Street Address:	411 Dixon Landing Road
City/Zip Code	Milpitas, CA 95035
Country	USA
Telephone:	+1 (408) 586 6200
Fax:	+1 (408) 586 6299
Director Radio Com. and EMC:	Peter Nevermann
Responsible Project Leader:	Ruther Navarro

2.2 Identification of the Client

Applicant's Name:	FIO Corporation
Street Address:	111 Queen St. East, Suite 500
City/Zip Code	Toronto, ON M5C 1S2
Country	Canada
Contact Person:	Hongtao Yan
Phone No.	416 368 8882
e-mail:	hyan@fio.com

2.3 Identification of the Manufacturer

Manufacturer's Name:	Same as Applicant
Manufacturers Address:	-------
City/Zip Code	-------
Country	-------

3 Equipment under Test (EUT)

3.1 EUT Specifications

Model No:	V200
HW Version :	2.0.0.0
SW Version :	1.89
FCC-ID :	2ANVA-V200
IC-ID:	22342-V200
FWIN:	Deki Reader V200
HVIN:	Deki Reader V200
PMN:	Deki Reader V200
Product Description:	Portable camera-based diagnostic device
Frequency Range / number of channels:	Nominal band: 2400 MHz – 2483.5 MHz; Bluetooth LE 4.0: Center to center: 2402 MHz – 2480 MHz, 40 channels Bluetooth 2.1+EDR: Center to center: 2402 MHz – 2480 MHz ,79 channels
Type(s) of Modulation:	Bluetooth 2.1+EDR: GFSK, π /4 DQPSK, 8DPSK BLE 4.0: GFSK
Modes of Operation:	Fix channel transmission
Antenna Information as declared:	max gain 2.5dBi
Max. Peak Conducted Output Power:	9.86dBm
Power Supply/ Rated Operating Voltage Range:	min: 3.6 VDC/ Vnom: 3.8 VDC / Vmax: 4.2 VDC
Operating Temperature Range	0^0 to 40^0 C
Other Radios included in the device:	Telit HE910-D: GSM: 850/900/1800/1900; UMTS FDD: Band I/II/IV/V/VIII; Telit JF2: GPS L1; Tiwi BLE: WLAN 802.11b/g/n;
Sample Revision	☐Prototype Unit; ■Production Unit; ☐Pre-Production
EUT Dimensions	25cm X 11cm X 12cm

3.2 EUT Sample details

EUT #	Serial Number	HW Version	SW Version	Notes/Comments
1	FH21103	2.0.0.0	1.89	Conducted measurements
2	FH21098	2.0.0.0	1.89	Radiated emissions

3.3 Accessory Equipment (AE) details

AE #	Type	Model	Manufacturer	Part Number
1	AC/DC adapter	GlobTek, Inc	GTM46101-1005-USB	WR9QA2000USBNMEDR6B

3.4 Test Sample Configuration

EUT Set-up #	Combination of AE used for test set up	Comments
1	EUT#1 + AE#1	-
2	EUT#2 + AE#1	-

3.5 Mode of Operation details

Mode of Operation	Description of Operating modes	Additional Information
Op. 1	GFSK	The EUT was configured to a fixed channel transmission with GFSK modulation using “adb” command provided by client that is not available to the end user
Op. 2	2EDR	The EUT was configured to a fixed channel transmission with 2EDR modulation using “adb” command provided by client that is not available to the end user
Op. 3	3EDR	The EUT was configured to a fixed channel transmission with 3EDR modulation using “adb” command provided by client that is not available to the end user
Op. 4	BTLE	The EUT was configured into BTLE mode using “adb” command provided by client that is not available to the end user

3.6 Justification for Worst Case Mode of Operation

During the testing process the EUT was tested with transmitter sets on low, mid and high channels. For radiated measurements, all data in this report shows the worst case between horizontal and vertical antenna polarizations and for all orientations of the EUT.

The highest power level was selected by using “adb” command provided by client. For Bluetooth basic/EDR, the 3EDR modulation scheme produced the highest output power (worst case) and was used in the evaluation of radiated emission; For BTLE, the radiated emission was test separately.

Conducted Peak power measurements used for reference:

	Modulation Scheme & Power(dBm)			
Channel	GFSK	2EDR	3EDR	LE
Low	9.15	9.16	9.86	9.16
Mid	9.15	9.1	9.86	9.07
High	9.14	9.16	9.86	9.12

4 Subject of Investigation

The objective of the measurements done by CETECOM Inc. was to assess the transmitter spurious emission of the EUT according to the relevant requirements specified in FCC rules Part 15.247 of Title 47 of the Code of Federal Regulations and Radio Standard Specification RSS-247 Issue 2 of ISED Canada.

This test report is to support a request for new equipment authorization under the:

- FCC ID: 2ANVA-V200
- IC ID: 22342-V200

5 Measurement Results Summary

Test Specification	Test Case	Temperature and Voltage Conditions	Mode	Pass	NA	NP	Result
§15.247(d) §15.209(a) RSS-Gen 6.13	TX Spurious emissions-Radiated	Nominal	BT 3EDR	■	☐	☐	Complies
§15.207(a) RSS Gen 8.8	AC Conducted Emissions	Nominal	BT 3EDR	■	☐	☐	Complies
§15.247(d) §15.209(a) RSS-Gen 6.13	TX Spurious emissions-Radiated	Nominal	BTLE	■	☐	☐	Complies
§15.207(a) RSS Gen 8.8	AC Conducted Emissions	Nominal	BTLE	■	☐	☐	Complies

Note: NA= Not Applicable; NP= Not Performed.

6 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus, with 95% confidence interval (in dB delta to result), based on a coverage factor k=1.

Radiated measurement

9 kHz to 30 MHz	±2.5 dB (Magnetic Loop Antenna)
30 MHz to 1000 MHz	±2.0 dB (Biconilog Antenna)
1 GHz to 40 GHz	±2.3 dB (Horn Antenna)

Conducted measurement

RF conducted measurement	±0.5 dB

According to TR 102 273 a multiplicative propagation of error is assumed for RF measurement systems. For this reason the RMS method is applied to dB values and not to linear values as appropriate for additive propagation of error. Also used: http://physics.nist.gov/cuu/Uncertainty/typeb.html. The above calculated uncertainties apply to direct application of the Substitution method. The Substitution method is always used when the EUT comes closer than 3 dB to the limit.

6.1 Environmental Conditions During Testing:

The following environmental conditions were maintained during the course of testing:

- Ambient Temperature: 20-25° C
- Relative humidity: 40-60%

6.2 Dates of Testing:

10/18/2017 – 11/08/2017

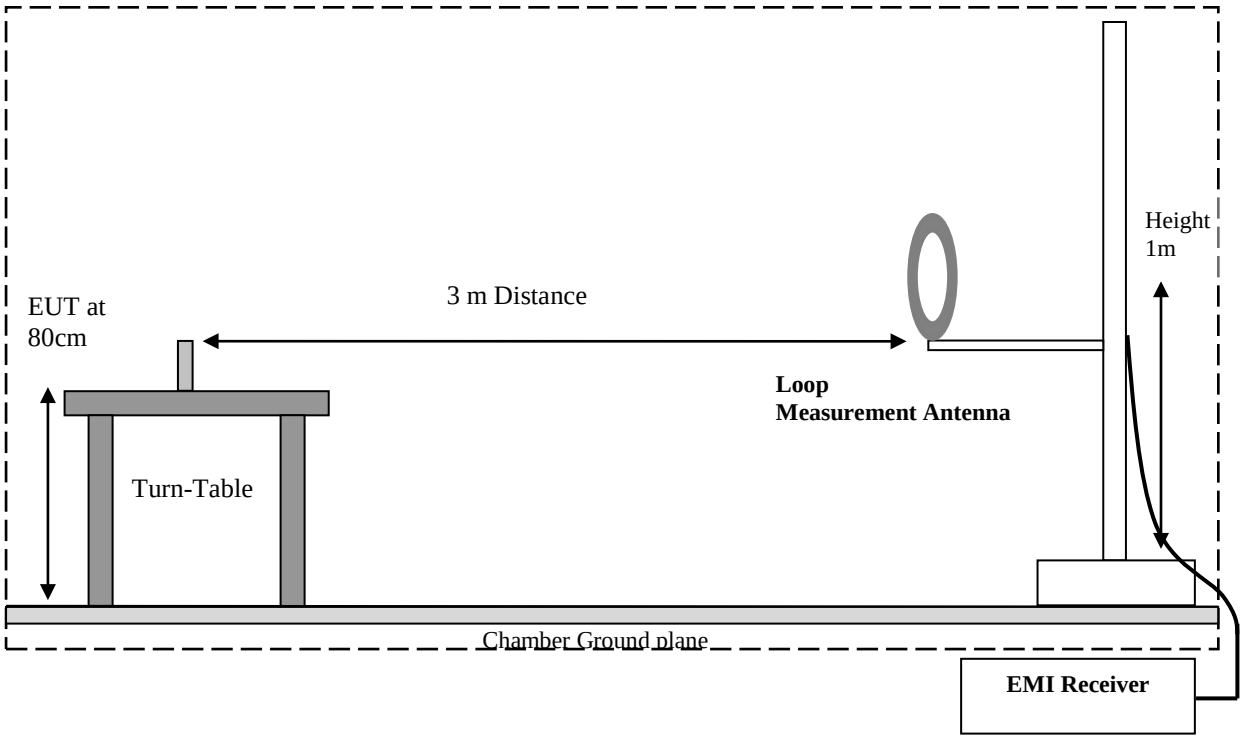
7 Measurement Procedures

7.1 Radiated Measurement

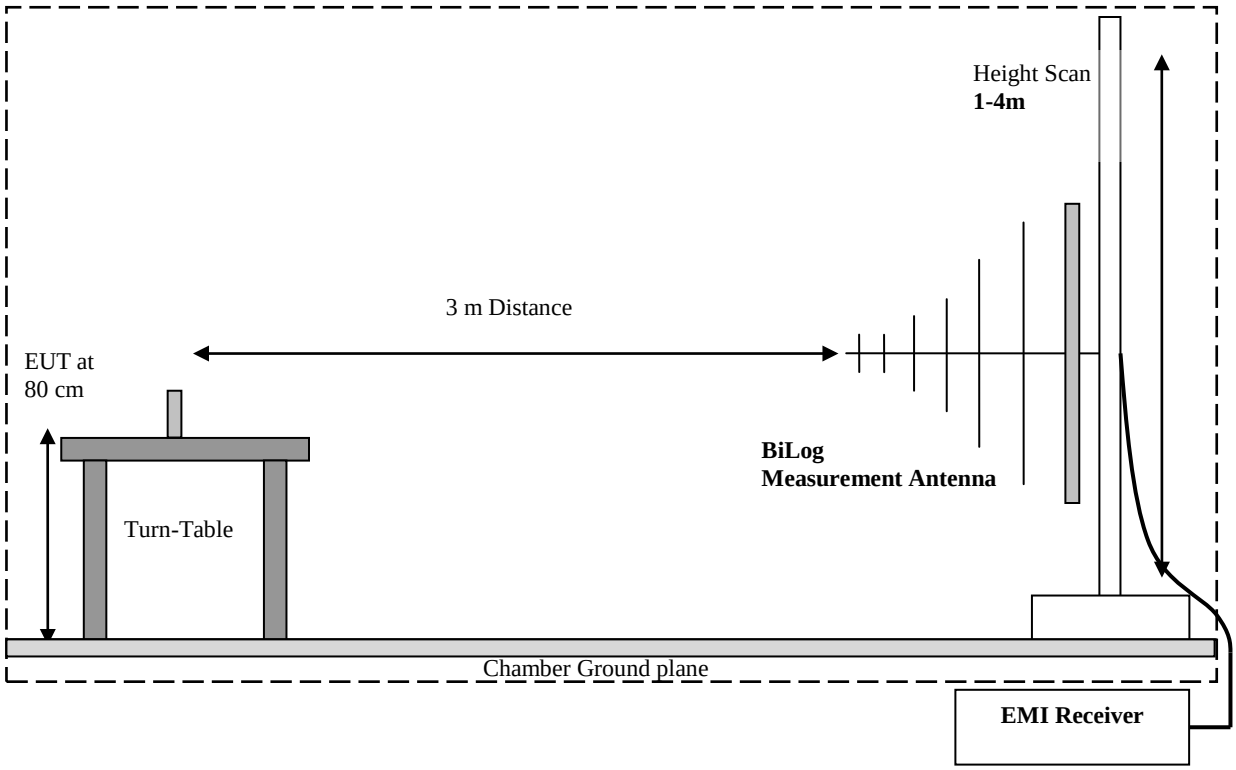
The radiated measurement is performed according to ANSI C63.10 (2013)

- The exploratory measurement is accomplished by running a matrix of 16 sweeps over the required frequency range with R&S Test-SW EMC32 for 4 positions of the turntable, two orthogonal positions of the EUT and both antenna polarizations. This procedure exceeds the requirement of the above standards to cover the 3 orthogonal axis of the EUT. A max peak detector is utilized during the exploratory measurement. The Test-SW creates an overall maximum trace for all 12 sweeps and saves the settings for each point of this trace. The maximum trace is part of the test report.
- The 10 highest emissions are selected with an automatic algorithm of EMC32 searching for peaks in the noise floor and ensuring that broadband signals are not selected multiple times.
- The maxima are then put through the final measurement and again maximized in a 90deg range of the turntable, fine search in frequency domain and height scan between 1m and 4m.
- The above procedure is repeated for all possible ways of power supply to EUT and for all supported modulations.
- In case there are no emissions above noise floor level only the maximum trace is reported as described above.
- The results are split up into up to 4 frequency ranges due to antenna bandwidth restrictions. A magnetic loop is used from 9 kHz to 30 MHz, a Biconilog antenna is used from 30 MHz to 1 GHz, and two different horn antennas are used to cover frequencies up to 40 GHz.

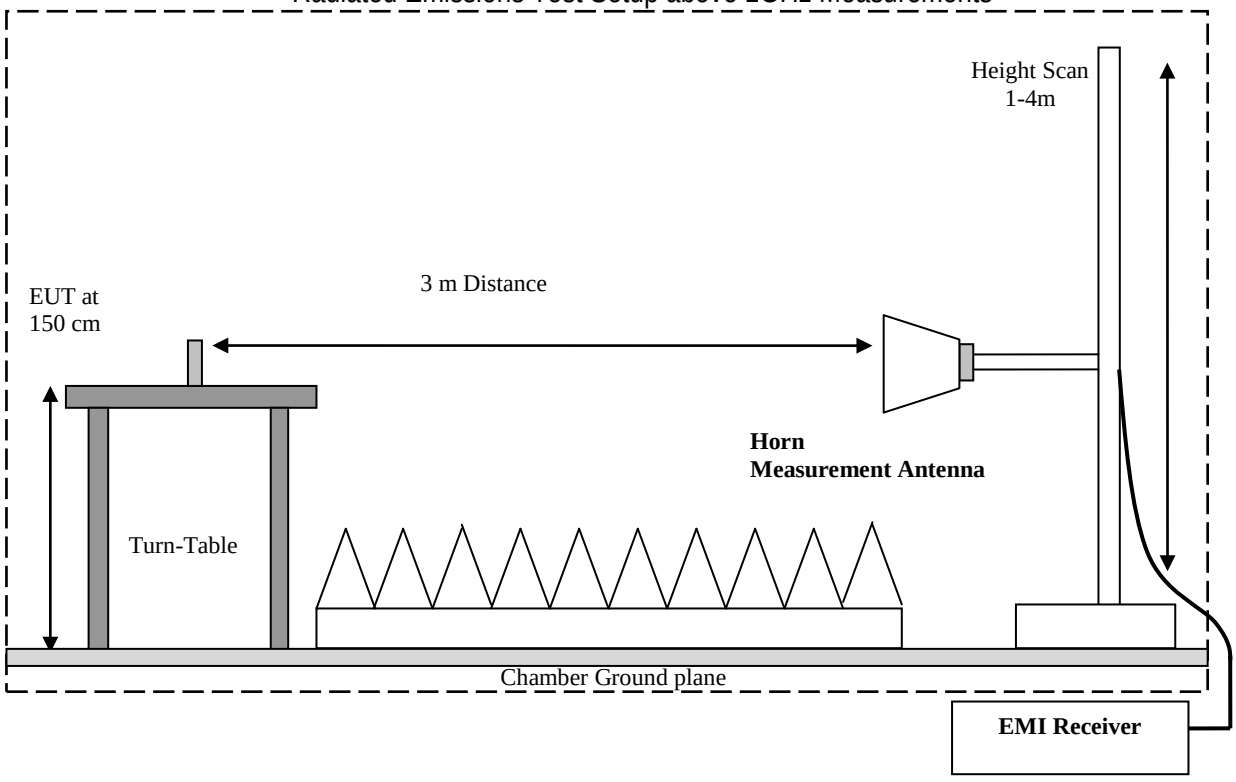
Radiated Emissions Test Setup below 30MHz Measurements



Radiated Emissions Test Setup 30MHz-1GHz Measurements



Radiated Emissions Test Setup above 1GHz Measurements



7.1.1 Sample Calculations for Field Strength Measurements

Field Strength is calculated from the Spectrum Analyzer/ Receiver readings, taking into account the following parameters:

1. Measured reading in dBµV
2. Cable Loss between the receiving antenna and SA in dB and
3. Antenna Factor in dB/m

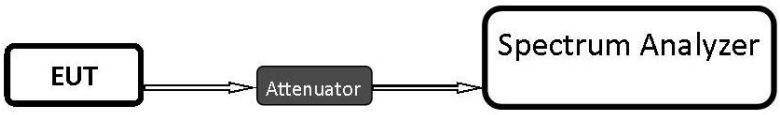
All radiated measurement plots in this report are taken from a test SW that calculates the Field Strength based on the following equation:

FS (dBµV/m) = Measured Value on SA (dBµV)- Cable Loss (dB)+ Antenna Factor (dB/m)

Example:

Frequency (MHz)	Measured SA (dBµV)	Cable Loss (dB)	Antenna Factor Correction (dB)	Field Strength Result (dBµV/m)
1000	80.5	3.5	14	98.0

7.2 RF Conducted Measurement Procedure



- Connect the equipment as shown in the above diagram.
- Adjust the settings of the SA (Rohde-Schwarz Spectrum Analyzer) to connect the EUT at the required mode of test.
- Measurements are to be performed with the EUT set to the low, middle and high channels and for worst case modulation schemes.

8 Test Result Data

8.1 Maximum Peak Conducted Output Power

8.1.1 Measurement according to FCC 558074 D01 DTS Meas Guidance v04 and ANSI C63.10 Section 7.8

8.1.2 Limits:

FCC 15.247: (b) The maximum peak conducted output power of the intentional radiator shall not exceed the following:

- (1) For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.
- (3) For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt.

IC RSS-247 5.4:

- (b) For FHSs operating in the band 2400-2483.5 MHz, the maximum peak conducted output power shall not exceed 1.0 W if the hopset uses 75 or more hopping channels; the maximum peak conducted output power shall not exceed 0.125 W if the hopset uses less than 75 hopping channels.
- (d) For DTSs employing digital modulation techniques operating in the bands 902-928 MHz and 2400-2483.5 MHz, the maximum peak conducted output power shall not exceed 1 W

8.1.3 Test conditions and setup:

Ambient Temperature	EUT Set-Up #	EUT operating mode	Power Input	Antenna Gain
23° C	1	1-4	120VAC	2.5 dBi

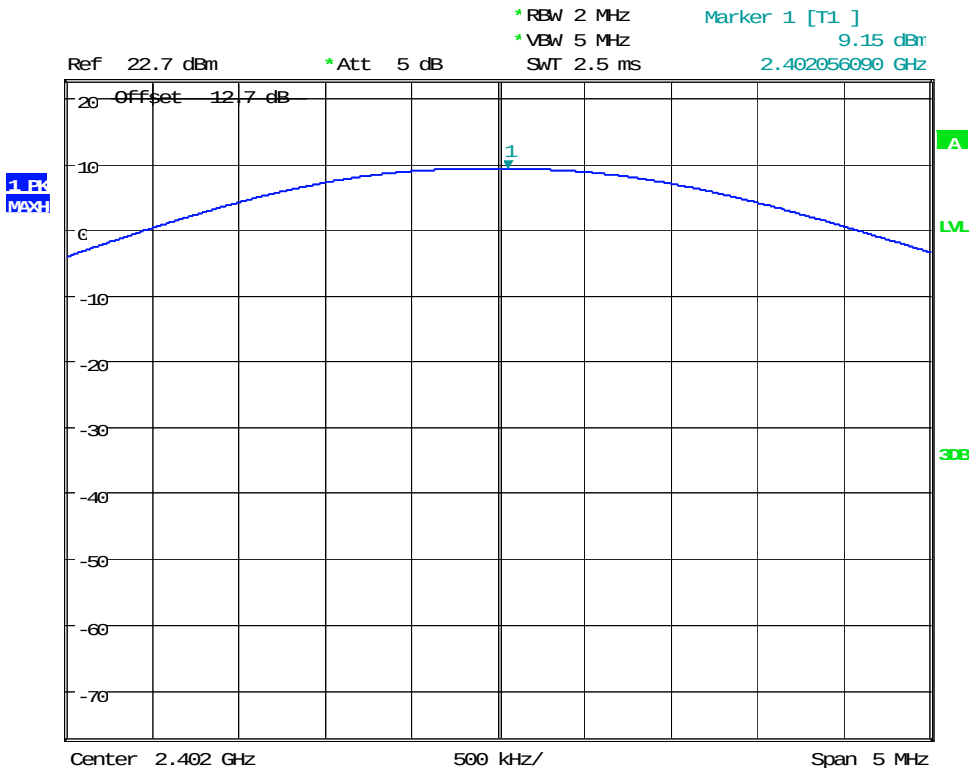
8.1.4 Measurement result:

Plot #	Modulation	Channel	RF Conducted Output Power (dBm)	E.I.R.P. (dBm)
1	GFSK	Low	9.15	11.65
2		Mid	9.15	11.65
3		High	9.14	11.64
4	2EDR	Low	9.16	11.66
5		Mid	9.1	11.6
6		High	9.16	11.66
7	3EDR	Low	9.86	12.36
8		Mid	9.86	12.36
9		High	9.86	12.36
10	BTLE	Low	9.16	11.66
11		Mid	9.07	11.57
12		High	9.12	11.62

8.1.5 Measurement Plots:

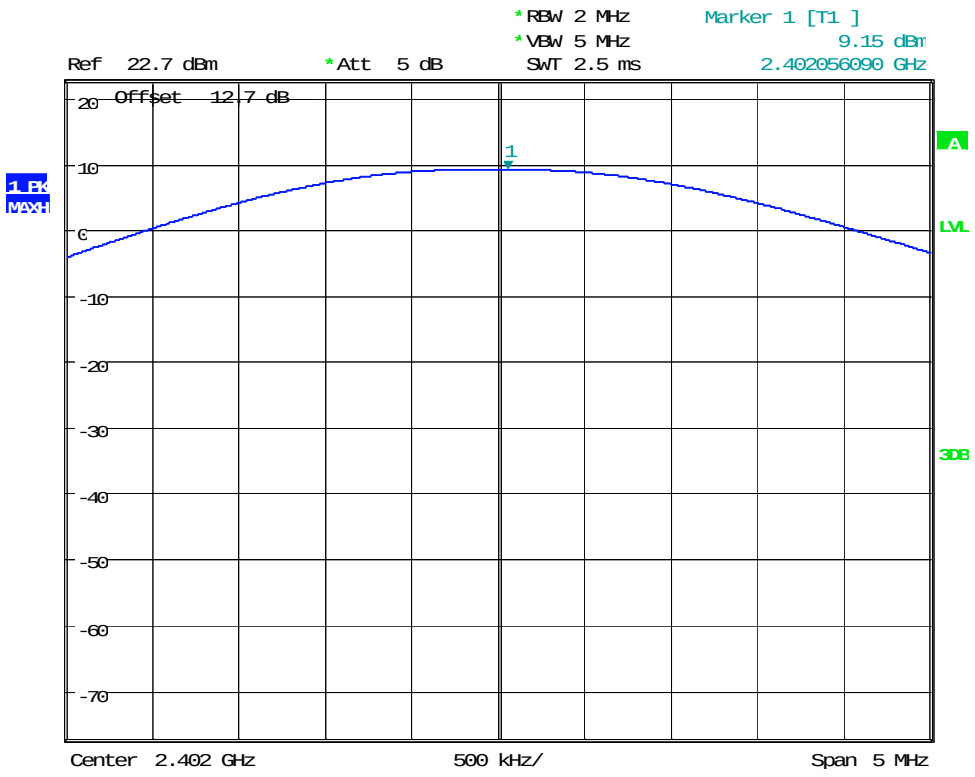
Plot #1

Low channel / 2402 MHz | Modulation: BT GFSK



Plot #2

Mid channel 2442 MHz | Modulation: BT GFSK

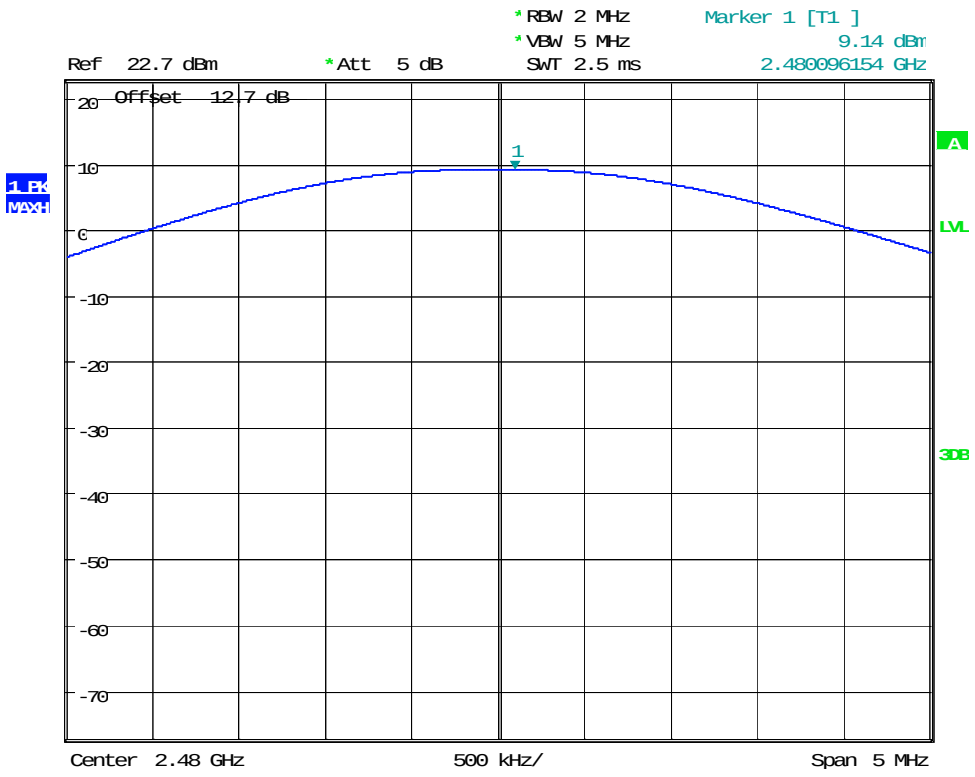


low

Date: 18.OCT.2017 13:52:46

Plot #3

High channel 2480 MHz | Modulation: BT GFSK

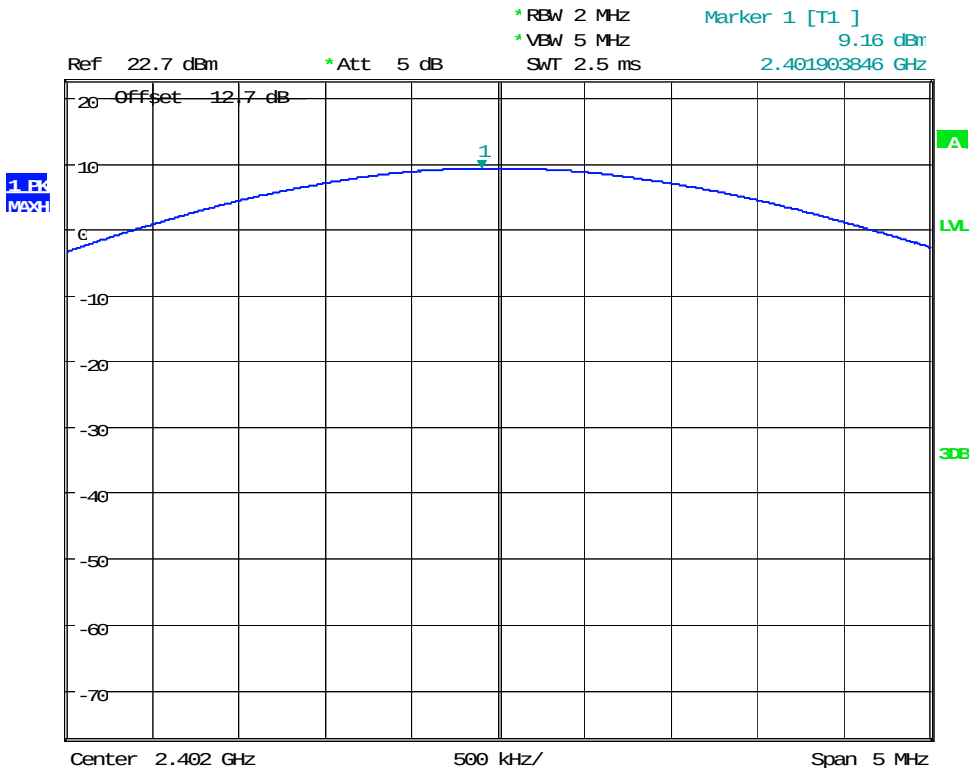


low

Date: 18.OCT.2017 13:55:02

Plot #4

Low channel 2402 MHz	Modulation: BT 2EDR

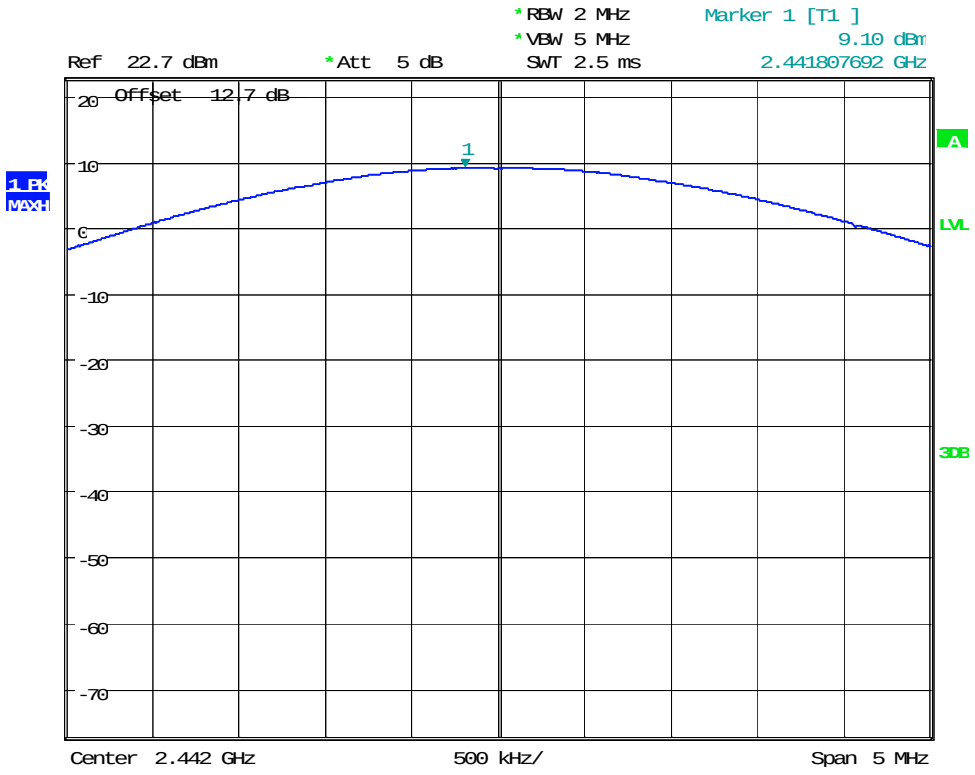


low

Date: 18.OCT.2017 13:55:52

Plot #5

Mid channel 2442 MHz | Modulation: BT 2EDR

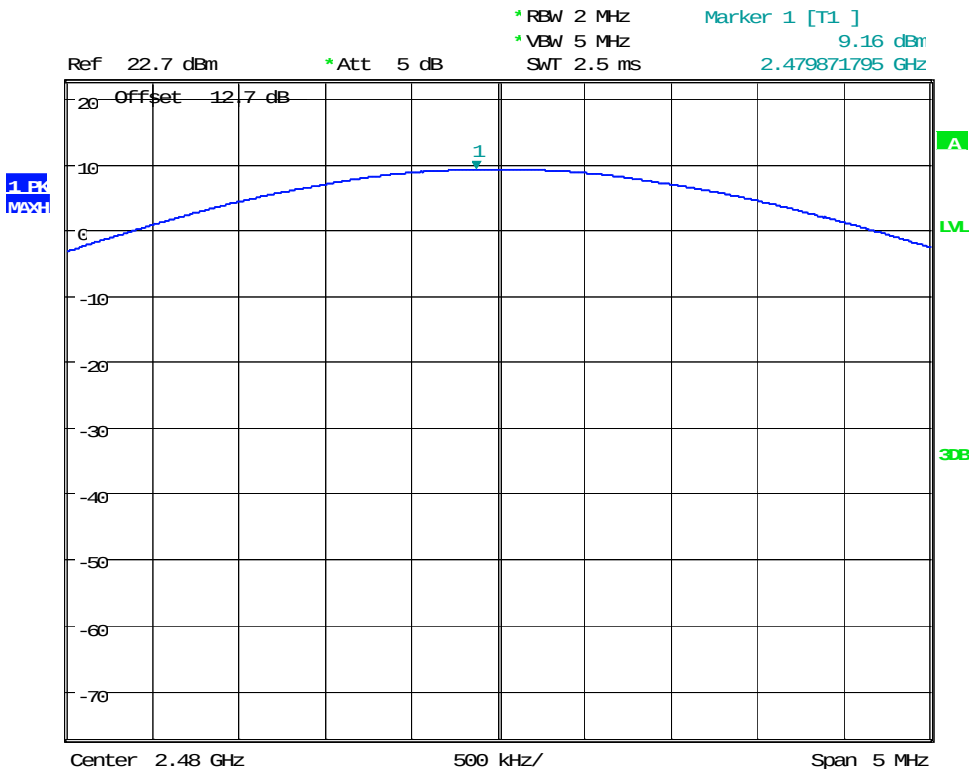


low

Date: 18.OCT.2017 13:56:37

Plot #6

High channel 2480 MHz | Modulation: BT 2EDR

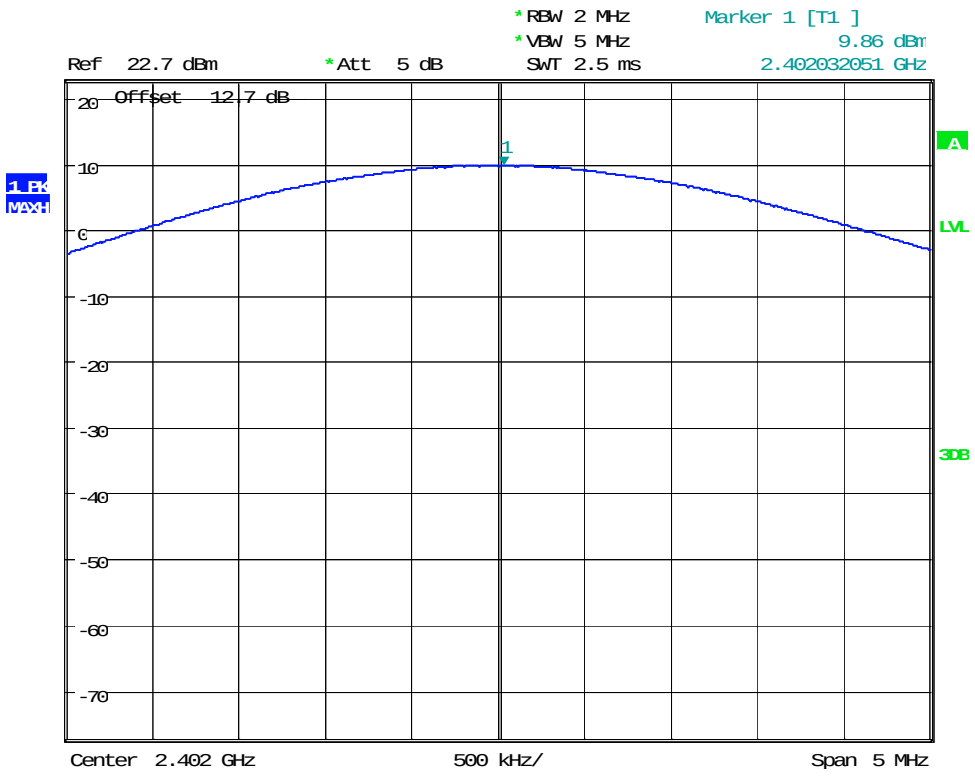


low

Date: 18.OCT.2017 13:57:33

Plot #7

Low channel 2402 MHz | Modulation: BT 3EDR

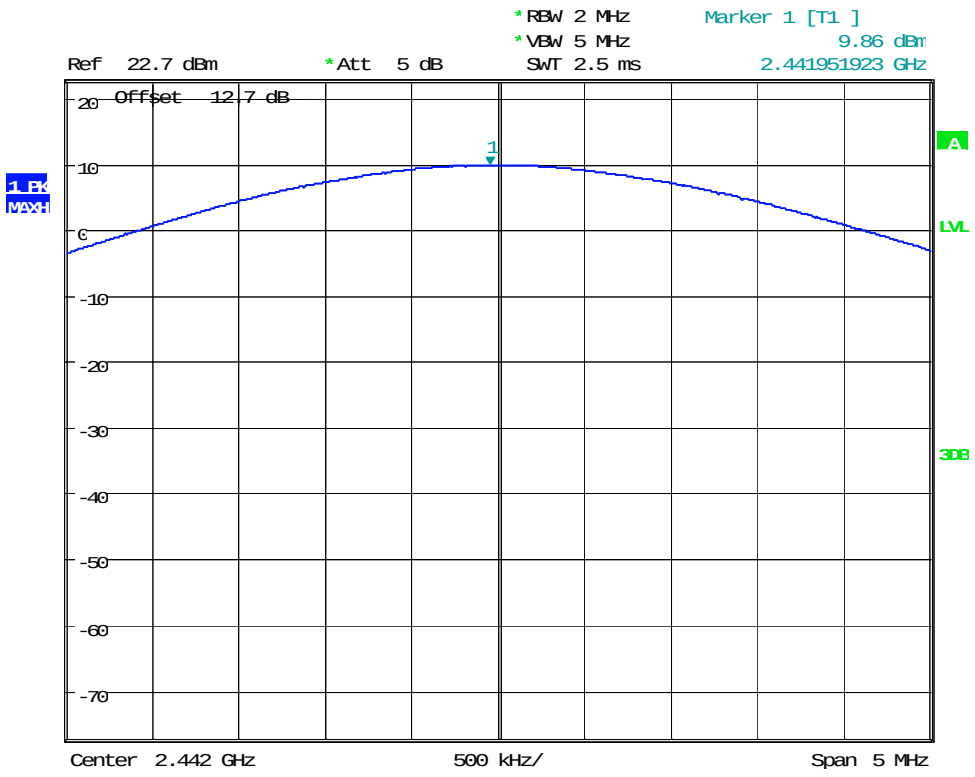


low

Date: 18.OCT.2017 13:58:19

Plot #8

Mid channel 2442 MHz	Modulation: BT 3EDR

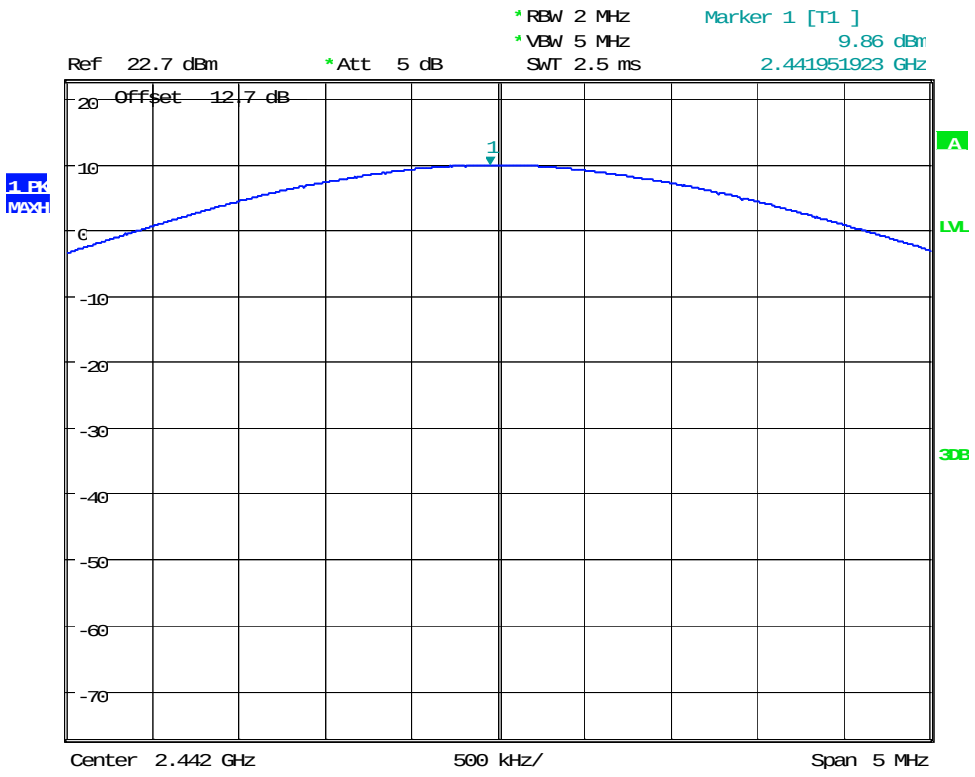


low

Date: 18.OCT.2017 13:58:59

Plot #9

High channel 2480 MHz | Modulation: BT 3EDR

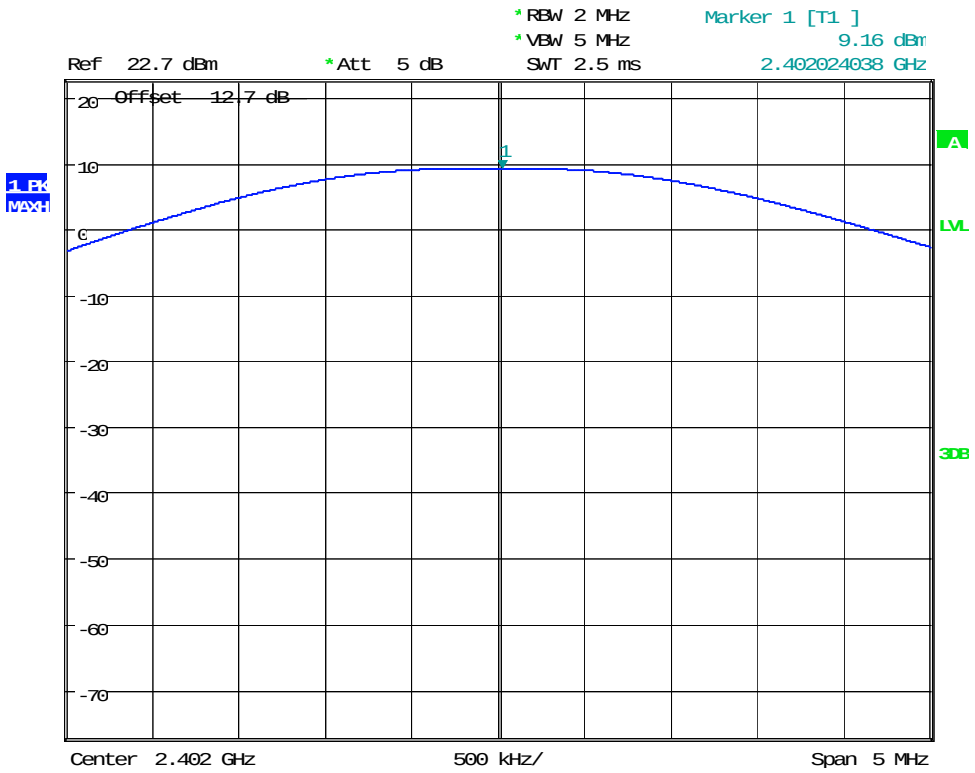


low

Date: 18.OCT.2017 13:58:59

Plot #10

Low channel 2402 MHz | Modulation: BT LE

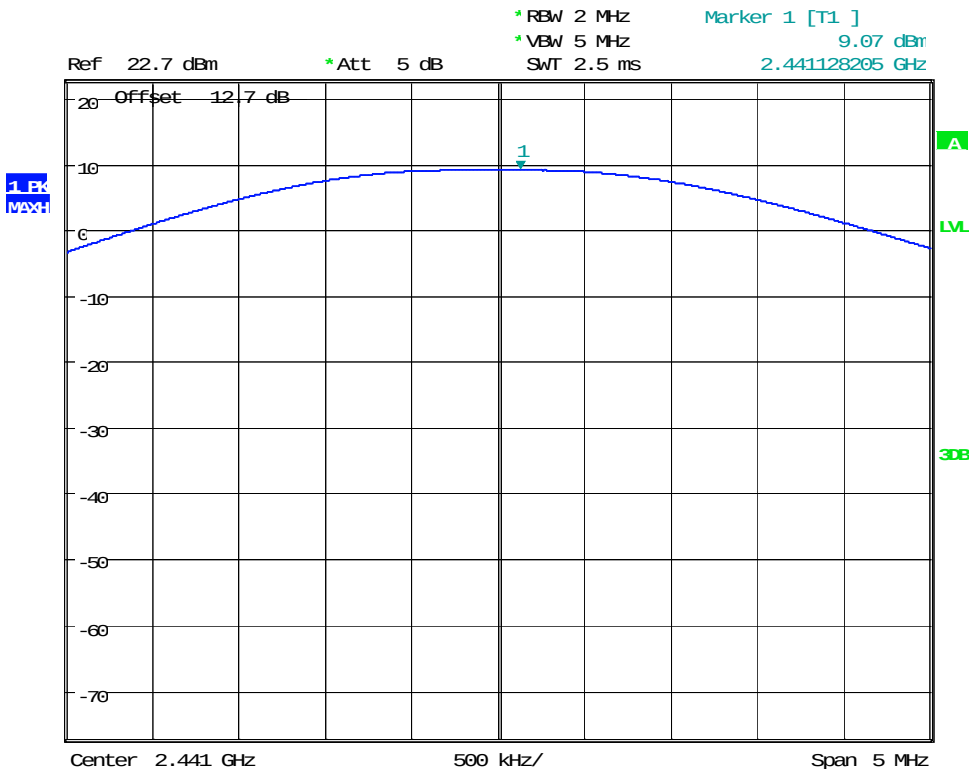


low

Date: 18.OCT.2017 14:03:57

Plot #11

Mid channel 2442 MHz | Modulation: BT LE

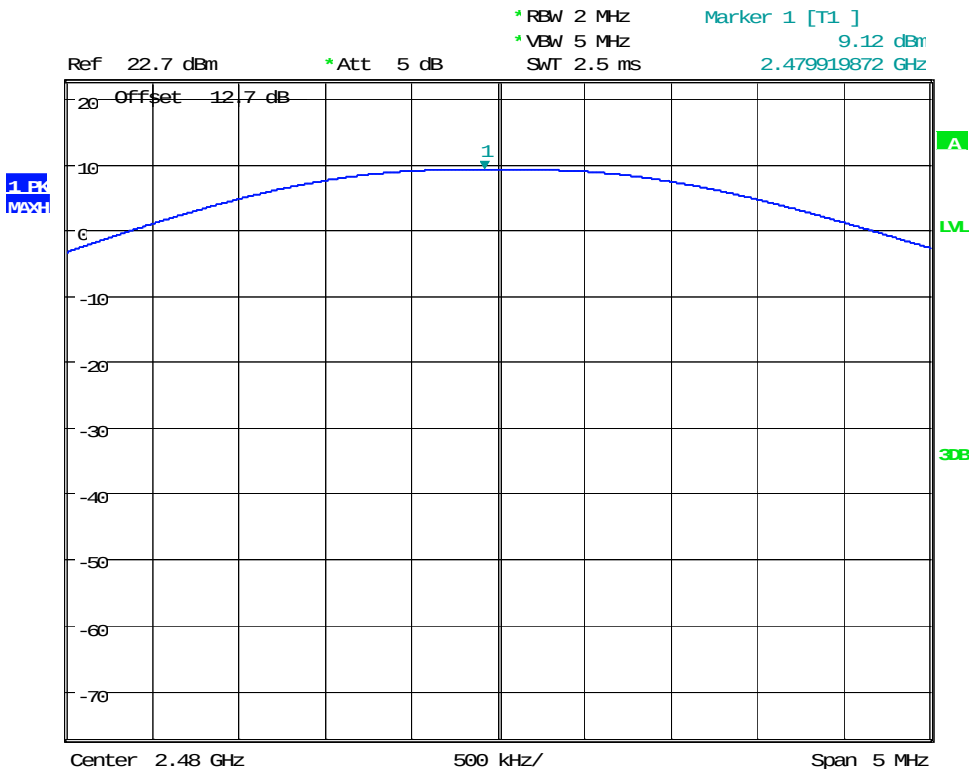


low

Date: 18.OCT.2017 14:04:41

Plot #12

High channel 2480 MHz | Modulation: BT LE



low

Date: 18.OCT.2017 14:05:24

8.2 Radiated Transmitter Spurious Emissions and Restricted Bands

8.2.1 Measurement according to ANSI C63.10 (2013)

Spectrum Analyzer Settings:

- Frequency = 9 KHz – 30 MHz
- RBW = 9 KHz
- Detector: Peak

- Frequency = 30 MHz – 1 GHz
- Detector = Peak / Quasi-Peak
- RBW= 120 KHz (<1GHz)

- Frequency > 1 GHz
- Detector = Peak / Average
- RBW = 1 MHz

- Radiated spurious emissions shall be measured for the transmit frequencies, transmit power, and data rate for the lowest, middle and highest channel in each frequency band of operation and for the highest gain antenna for each antenna type, and using the appropriate parameters and test requirements.
- The highest (or worst-case) data rate shall be recorded for each measurement.
- For testing at distance other than the specified in the standard, the limit conversion is calculated by using 40 dB/decade extrapolation factor as follow: Conversion factor (CF) = 40 log (D/d) = 40 log (300m / 3m) = 80dB

8.2.2 Limits:

FCC §15.247

- In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

FCC §15.209 & RSS-Gen 8.9

- Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency of emission (MHz)	Field strength (µV/m)	Measurement Distance (m)	Field strength @ 3m (dBµV/m)
0.009–0.490	2400/F(kHz) / ---------	300	-
0.490–1.705	24000/F(kHz) / --------	30	-
1.705–30.0	30 / (29.5)	30	-
30–88	100	3	40 dBµV/m
88–216	150	3	43.5 dBµV/m
216–960	200	3	46 dBµV/m
Above 960	500	3	54 dBµV/m

FCC §15.205 & RSS-Gen 8.10

- Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
[1]0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	Above 38.6
13.36-13.41			

- Radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).
  *PEAK LIMIT= 74 dBµV/m
  *AVG. LIMIT= 54 dBµV/m

8.2.3 Test conditions and setup:

Ambient Temperature	EUT Set-Up #	EUT operating mode	Power Input
23° C	2	3,4	120VAC

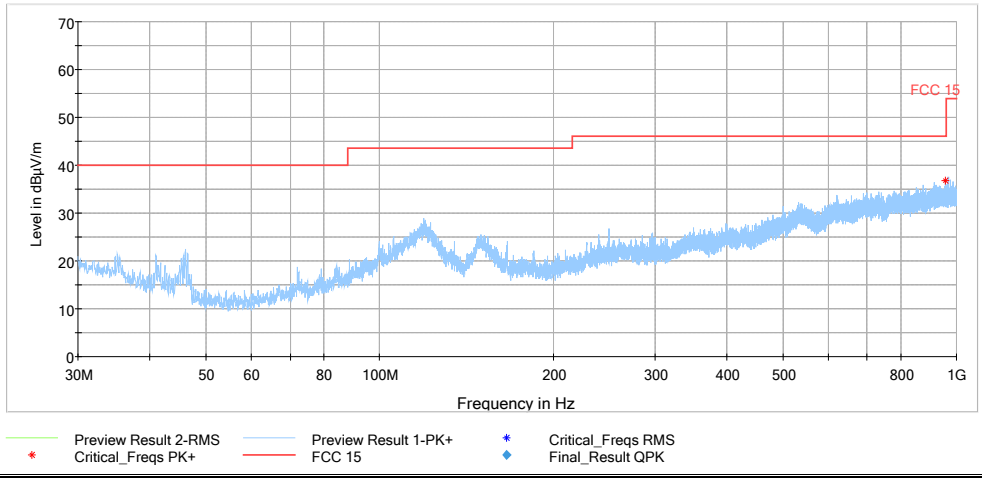
8.2.4 Measurement result:

Plot #	Mode	Channel #	Scan Frequency	Limit	Result
1-3	BT 3EDR	Low	30 MHz – 18 GHz	See section 8.2.2	Pass
4-8	BT 3EDR	Mid	9 kHz – 26 GHz	See section 8.2.2	Pass
9-11	BT 3EDR	High	30 MHz – 18 GHz	See section 8.2.2	Pass
12-14	BT LE	Low	30 MHz – 18 GHz	See section 8.2.2	Pass
15-19	BT LE	Mid	9 kHz – 26 GHz	See section 8.2.2	Pass
20-22	BT LE	High	30 MHz – 18 GHz	See section 8.2.2	Pass

8.2.5 Measurement Plots:

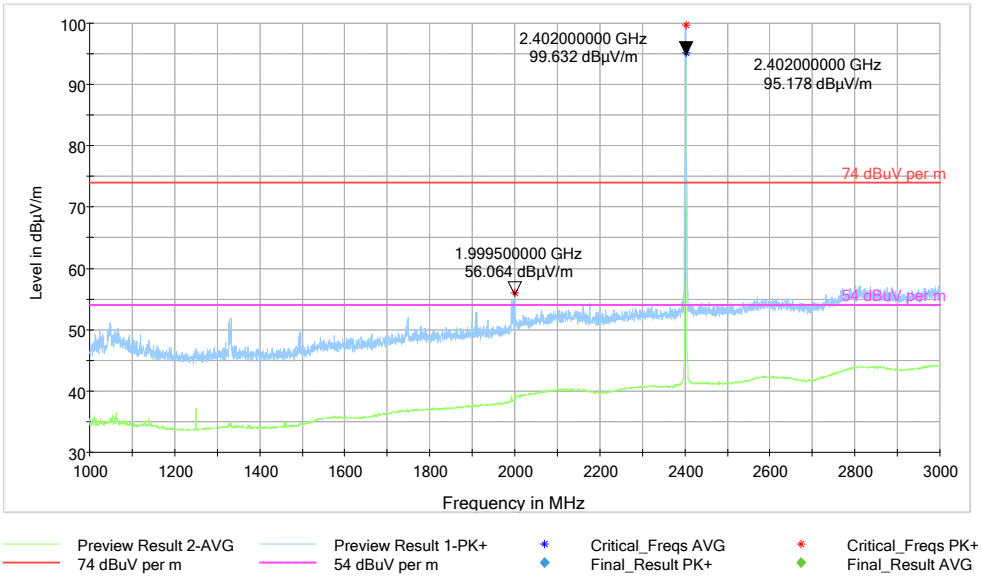
Plot #1 Radiated Emissions: 30 MHz – 1GHz		
Modulation: BT 3EDR	Channel: Low	

Disclaimer: Any measurement data within 2dB from the limit line is conditional PASS/FAIL due to measurement uncertainty considerations.



Plot # 2 Radiated Emissions: 1-3 GHz		
Modulation: BT 3EDR	Channel: Low	

Disclaimer: Any measurement data within 2dB from the limit line is conditional PASS/FAIL due to measurement uncertainty considerations.



Note: The peak signal above is the transmit channel.

Plot # 3 Radiated Emissions: 3-18 GHz

Modulation: BT 3EDR	Channel: Low	

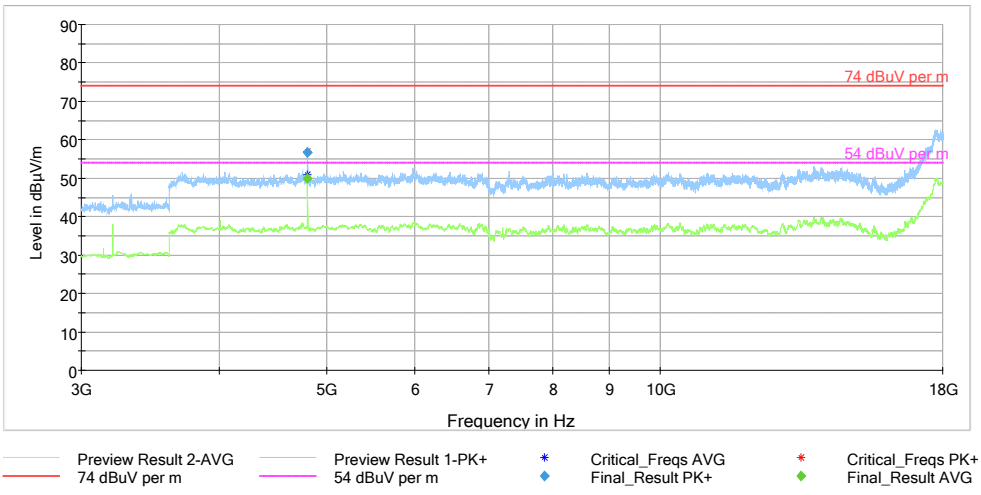
Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
4803.980000	56.71	---	74.00	17.29	100.0	1000.000	158.0	H	2.0
4804.000000	---	50.00	54.00	4.00	100.0	1000.000	156.0	H	2.0

(continuation of the "Final_Result" table from column 15 ...)

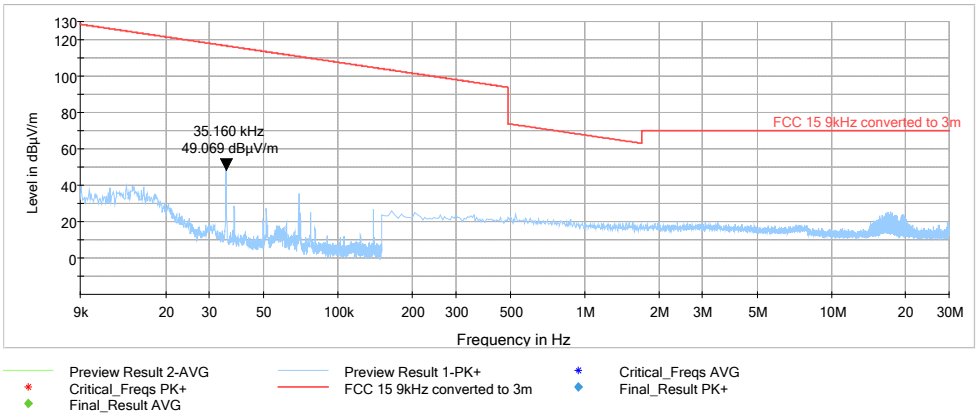
Frequency (MHz)	Corr. (dB)	Comment
4803.980000	-20.5	4:29:10 PM - 10/20/2017
4804.000000	-20.5	4:30:12 PM - 10/20/2017

Disclaimer: Any measurement data within 2dB from the limit line is conditional PASS/FAIL due to measurement uncertainty considerations.



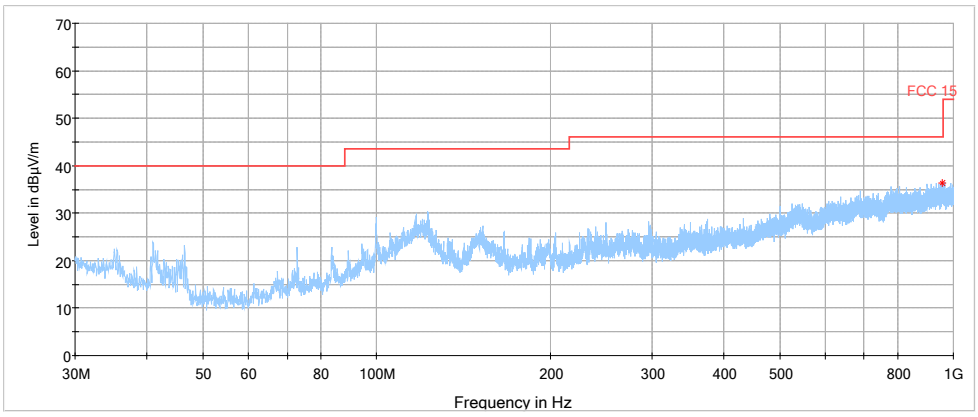
Plot # 4 Radiated Emissions: 9 KHz – 30 MHz		
Modulation: BT 3EDR	Channel: Mid	

Disclaimer: Any measurement data within 2dB from the limit line is conditional PASS/FAIL due to measurement uncertainty considerations.



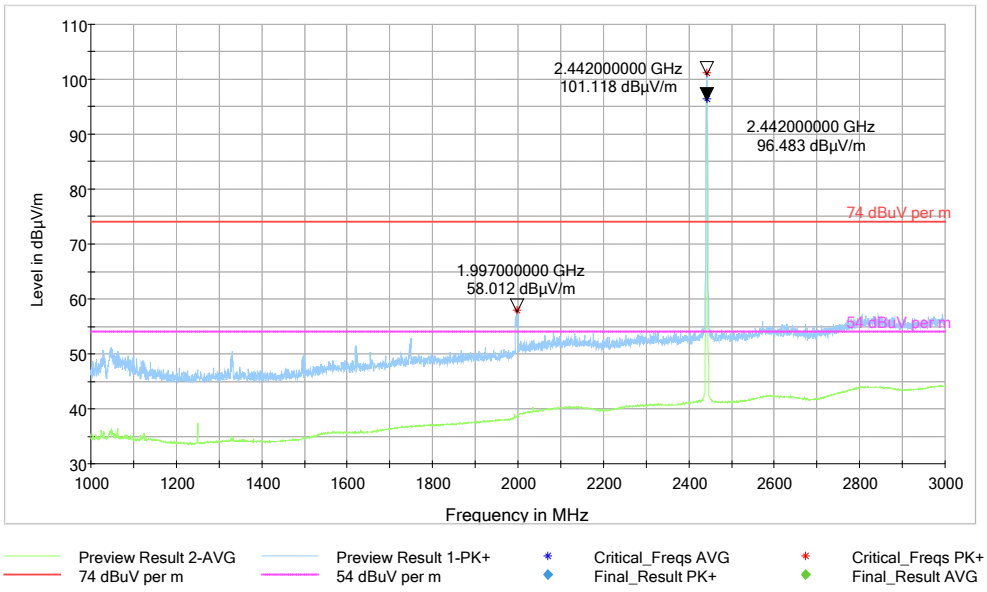
Plot #5 Radiated Emissions: 30 MHz – 1GHz		
Modulation: BT 3EDR	Channel: Mid	

Disclaimer: Any measurement data within 2dB from the limit line is conditional PASS/FAIL due to measurement uncertainty considerations.



Plot #6 Radiated Emissions: 1-3 GHz		
Modulation: BT 3EDR	Channel: Mid	

Disclaimer: Any measurement data within 2dB from the limit line is conditional PASS/FAIL due to measurement uncertainty considerations.



Note: The peak signal above is the transmit channel.

Plot #7 Radiated Emissions: 3-18 GHz		
Modulation: BT 3EDR	Channel: Mid	

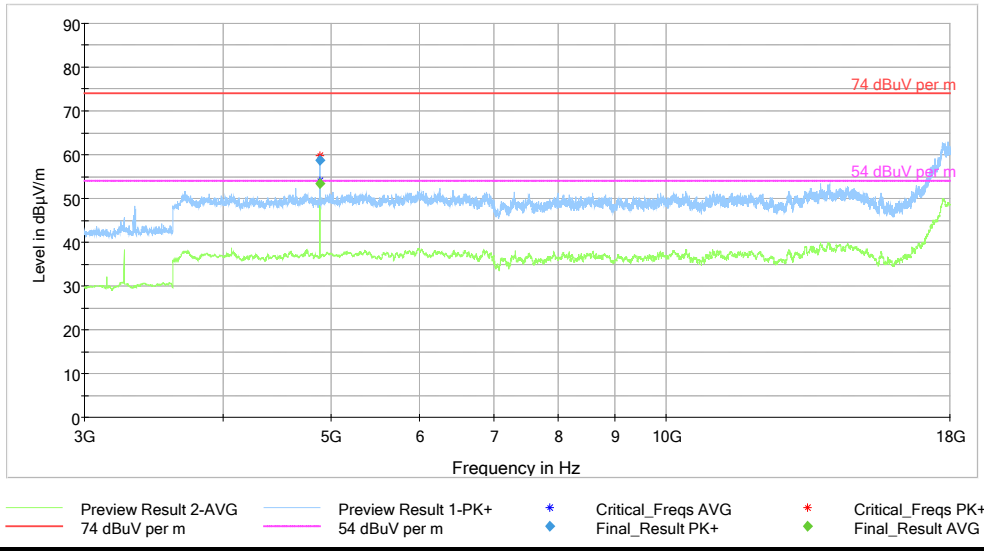
Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
4883.980000	58.78	---	74.00	15.22	100.0	1000.000	158.0	H	10.0
4884.000000	---	53.38	54.00	0.62	100.0	1000.000	160.0	H	6.0

(continuation of the "Final_Result" table from column 15 ...)

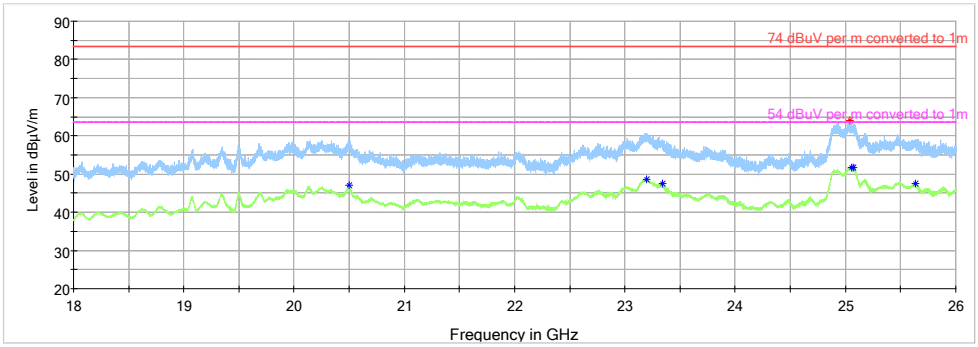
Frequency (MHz)	Corr. (dB)	Comment
4883.980000	-20.0	5:11:03 PM - 10/20/2017
4884.000000	-20.0	5:12:07 PM - 10/20/2017

Disclaimer: Any measurement data within 2dB from the limit line is conditional PASS/FAIL due to measurement uncertainty considerations.



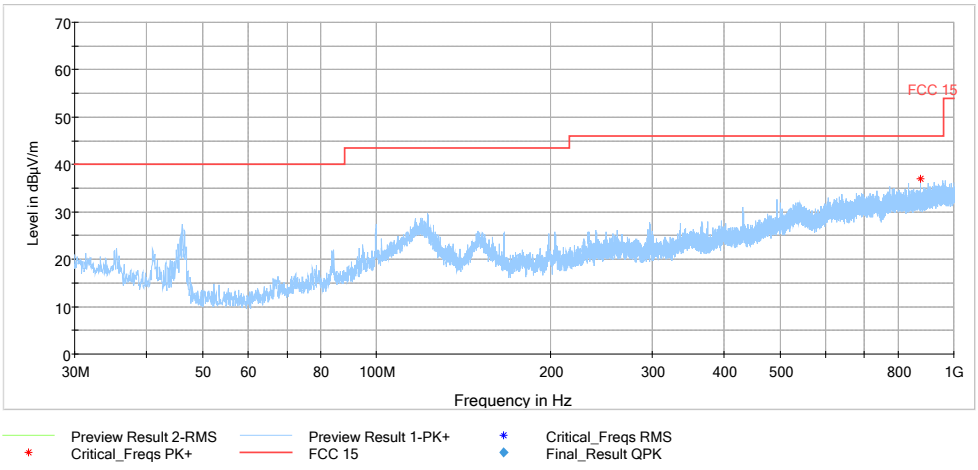
Plot #8 Radiated Emissions: 18-26 GHz		
Modulation: BT 3EDR	Channel: Mid	

Disclaimer: Any measurement data within 2dB from the limit line is conditional PASS/FAIL due to measurement uncertainty considerations.



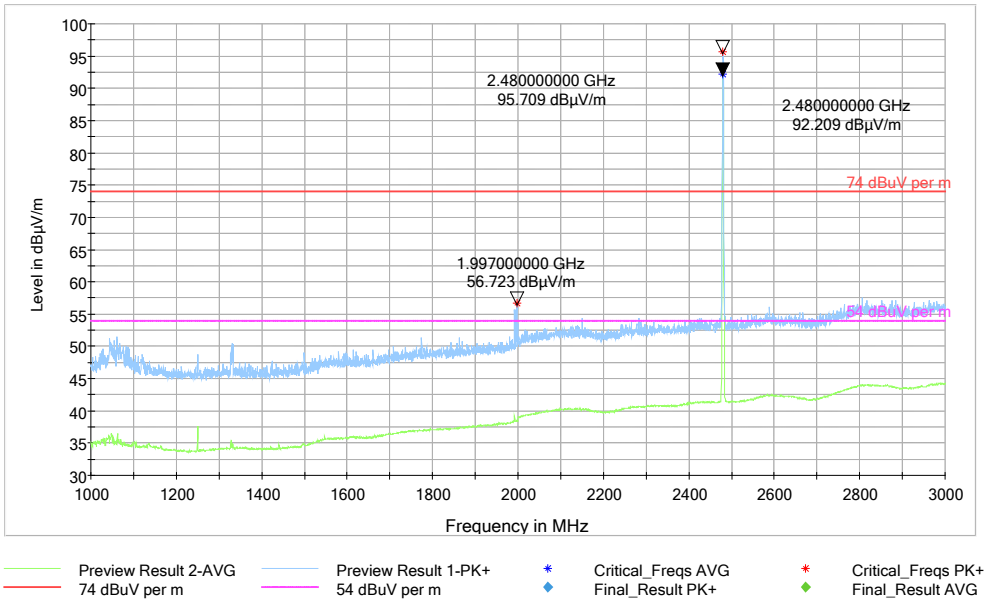
Plot #9 Radiated Emissions: 30 MHz – 1GHz		
Modulation: BT 3EDR	Channel: High	

Disclaimer: Any measurement data within 2dB from the limit line is conditional PASS/FAIL due to measurement uncertainty considerations.



Plot # 10 Radiated Emissions: 1-3 GHz and Restricted Bands		
Modulation: BT 3EDR	Channel: High	

Disclaimer: Any measurement data within 2dB from the limit line is conditional PASS/FAIL due to measurement uncertainty considerations.



Note: The peak signal above is the transmit channel.

Plot #11 Radiated Emissions: 3-18 GHz

Modulation: BT EDR | Channel: High

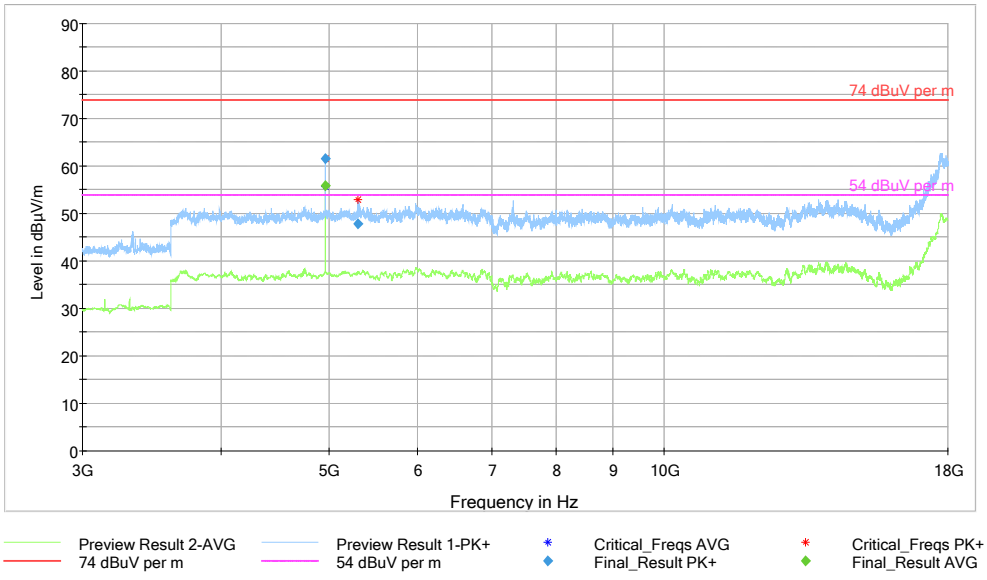
Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
4959.980000	61.51	---	74.00	12.49	100.0	1000.000	161.0	V	19.0
4960.000000	---	55.83	54.00	-1.83	100.0	1000.000	160.0	V	19.0
5309.680000	47.84	---	74.00	26.16	100.0	1000.000	180.0	V	242.0

(continuation of the "Final_Result" table from column 15 ...)

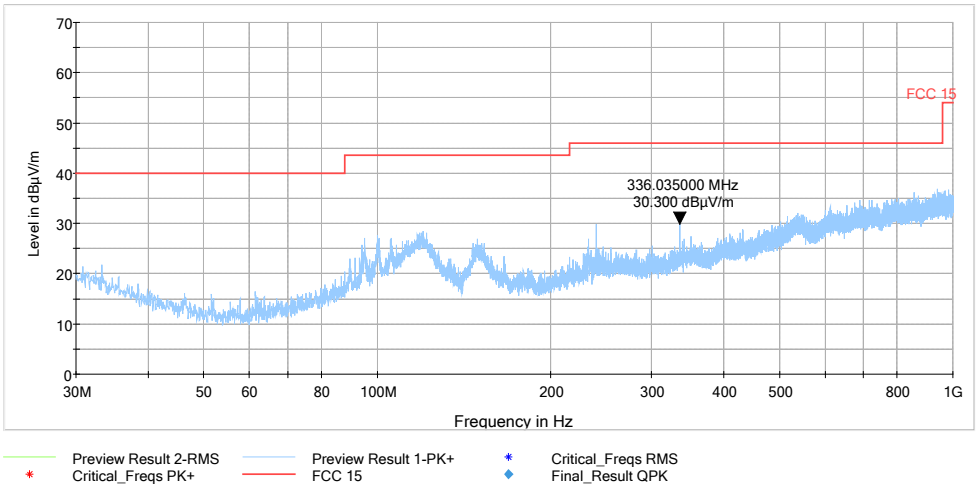
Frequency (MHz)	Corr. (dB)	Comment
4959.980000	-20.5	6:03:00 PM - 10/20/2017
4960.000000	-20.5	6:05:56 PM - 10/20/2017
5309.680000	-19.7	6:04:31 PM - 10/20/2017

Disclaimer: Any measurement data within 2dB from the limit line is conditional PASS/FAIL due to measurement uncertainty considerations.



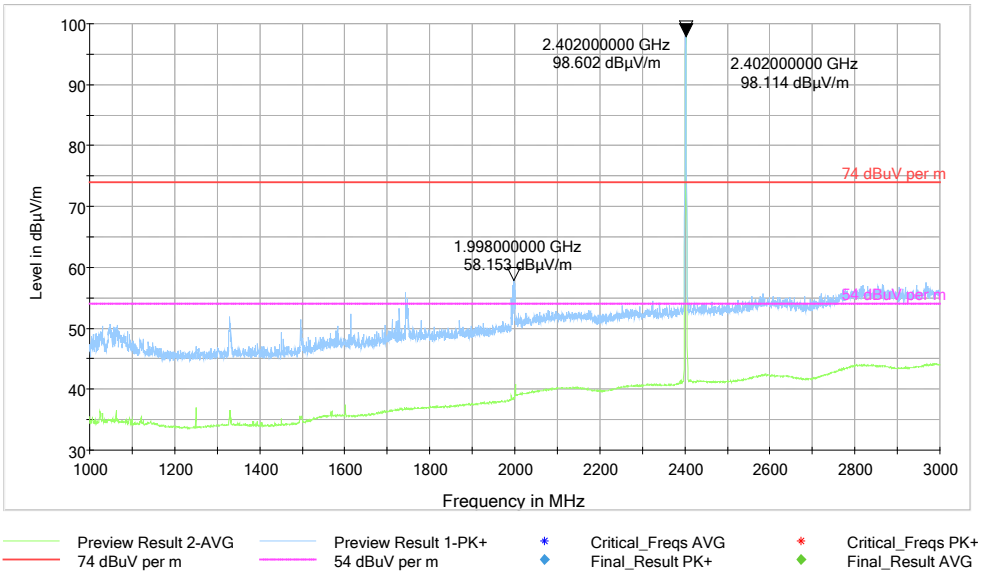
Plot #12 Radiated Emissions: 30 MHz – 1GHz		
Modulation: BT LE	Channel: Low	

Disclaimer: Any measurement data within 2dB from the limit line is conditional PASS/FAIL due to measurement uncertainty considerations.



Plot #13 Radiated Emissions: 1-3 GHz		
Modulation: BT LE	Channel: Low	

Disclaimer: Any measurement data within 2dB from the limit line is conditional PASS/FAIL due to measurement uncertainty considerations.



Note: The peak signal above is the transmit channel.

Plot #14 Radiated Emissions: 3-18 GHz

Modulation: BT LE | Channel: Low

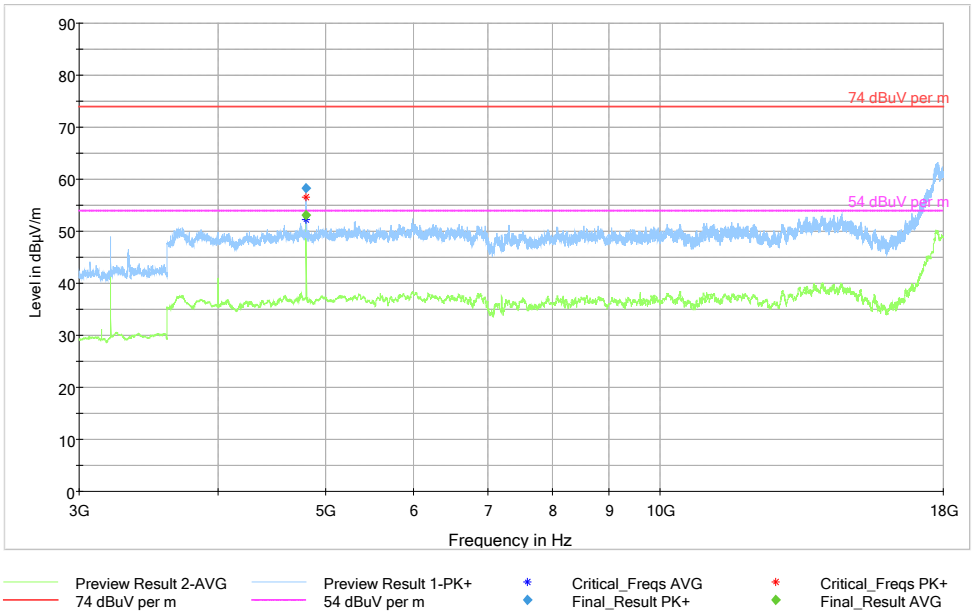
Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
4803.500000	58.32	---	74.00	15.68	100.0	1000.000	158.0	V	-30.0
4804.000000	---	53.11	54.00	0.89	100.0	1000.000	154.0	V	-30.0

(continuation of the "Final_Result" table from column 15 ...)

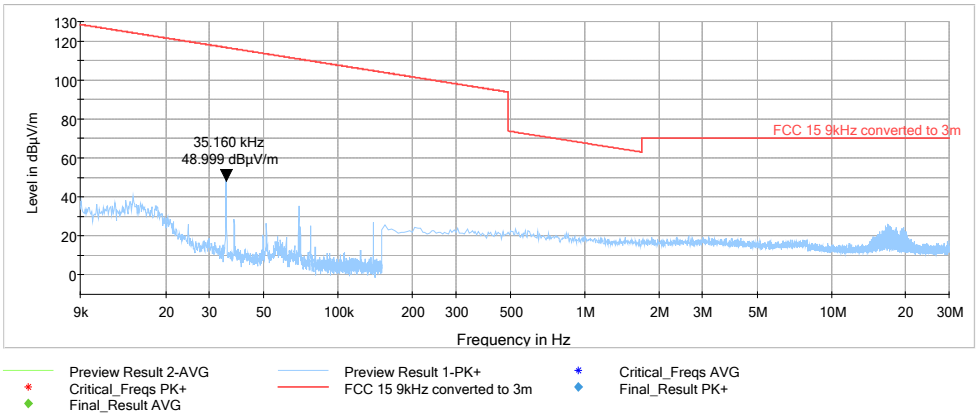
Frequency (MHz)	Corr. (dB)	Comment
4803.500000	-20.5	9:02:54 PM - 10/20/2017
4804.000000	-20.5	9:04:05 PM - 10/20/2017

Disclaimer: Any measurement data within 2dB from the limit line is conditional PASS/FAIL due to measurement uncertainty considerations.



Plot # 15 Radiated Emissions: 9 KHz – 30 MHz		
Modulation: BT LE	Channel: Mid	

Disclaimer: Any measurement data within 2dB from the limit line is conditional PASS/FAIL due to measurement uncertainty considerations.



Plot #16 Radiated Emissions: 30 MHz – 1GHz		
Modulation: BT LE	Channel: Mid	

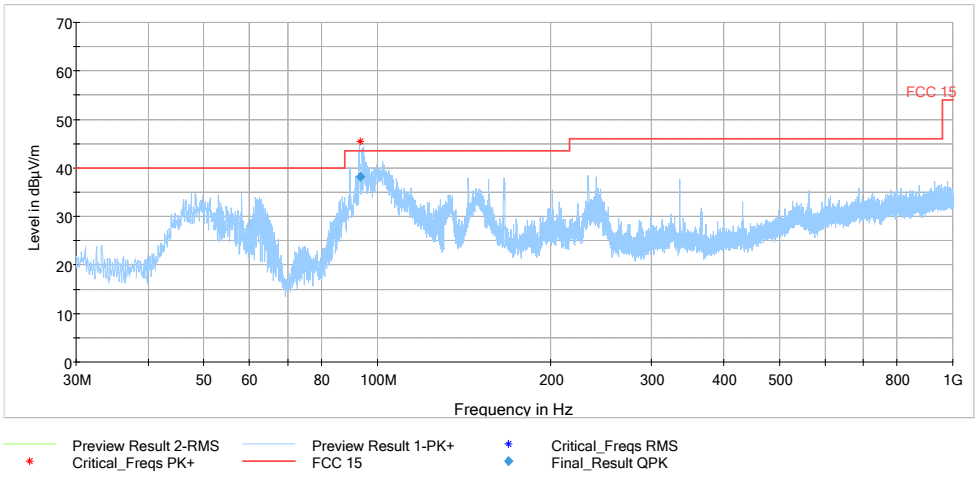
Final_Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
93.348900	38.24	43.52	5.29	200.0	120.000	150.0	V	221.0	13.4

(continuation of the "Final_Result" table from column 16 ...)

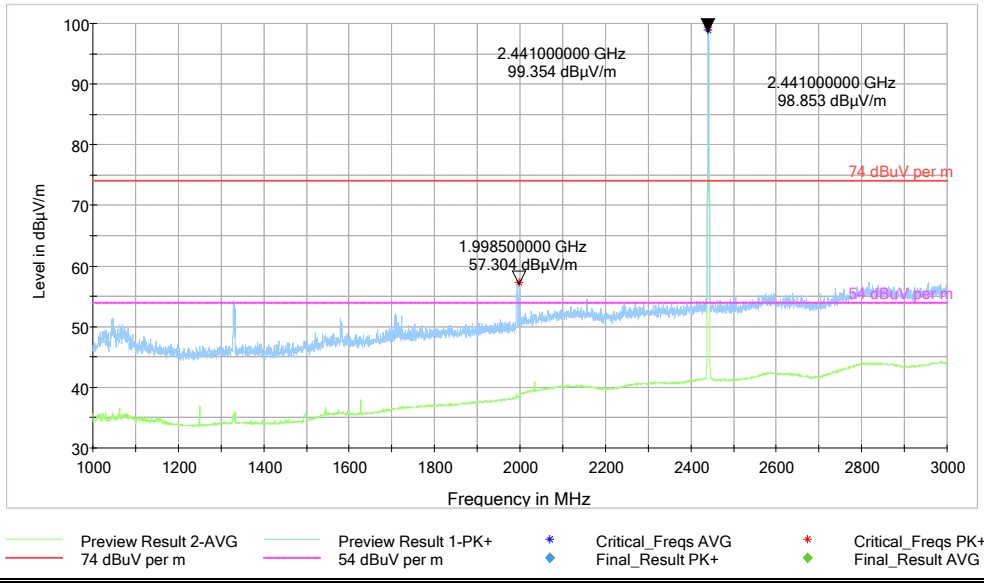
Frequency (MHz)	Comment
93.348900	4:20:49 PM - 10/25/2017

Disclaimer: Any measurement data within 2dB from the limit line is conditional PASS/FAIL due to measurement uncertainty considerations.



Plot #17 Radiated Emissions: 1-3 GHz		
Modulation: BT LE	Channel: Mid	

Disclaimer: Any measurement data within 2dB from the limit line is conditional PASS/FAIL due to measurement uncertainty considerations.



Note: The peak signal above is the transmit channel.

Plot #18 Radiated Emissions: 3-18 GHz

Modulation: BT LE | Channel: Mid

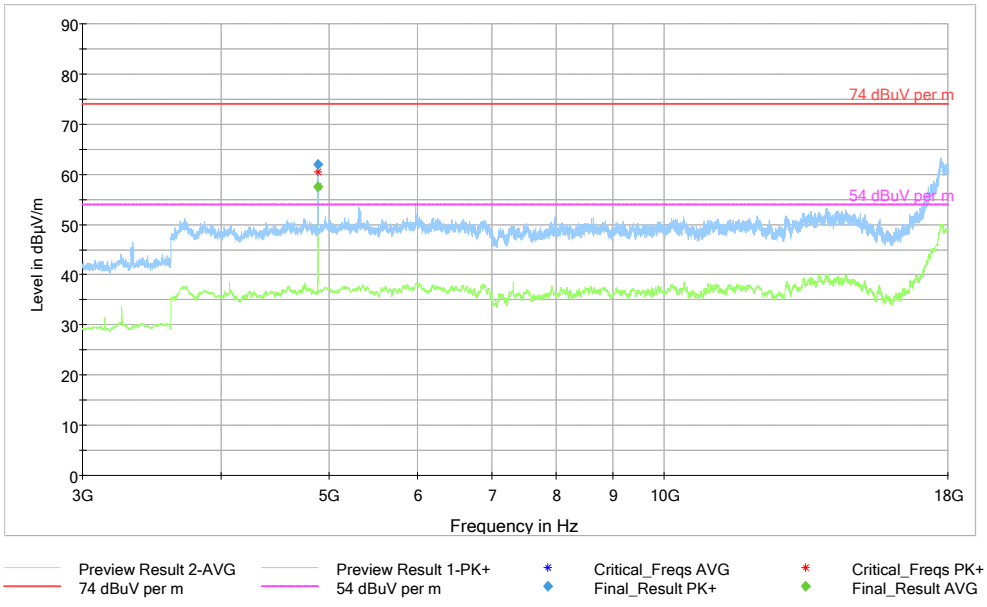
Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
4881.500000	61.94	---	74.00	12.06	100.0	1000.000	154.0	V	-30.0
4882.000000	---	57.47	54.00	-3.47	100.0	1000.000	154.0	V	-32.0

(continuation of the "Final_Result" table from column 15 ...)

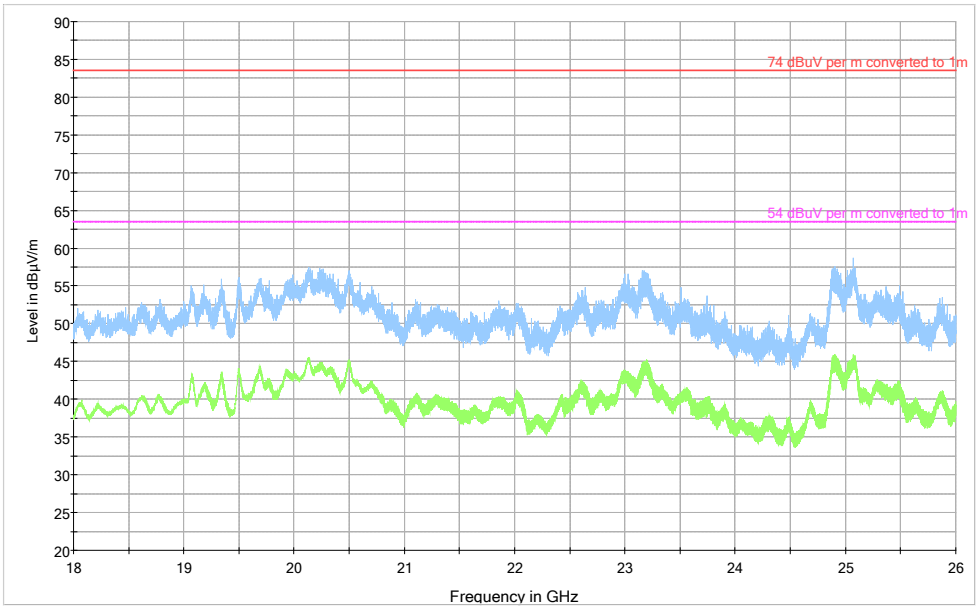
Frequency (MHz)	Corr. (dB)	Comment
4881.500000	-20.0	8:25:59 PM - 10/20/2017
4882.000000	-20.0	8:27:08 PM - 10/20/2017

Disclaimer: Any measurement data within 2dB from the limit line is conditional PASS/FAIL due to measurement uncertainty considerations.



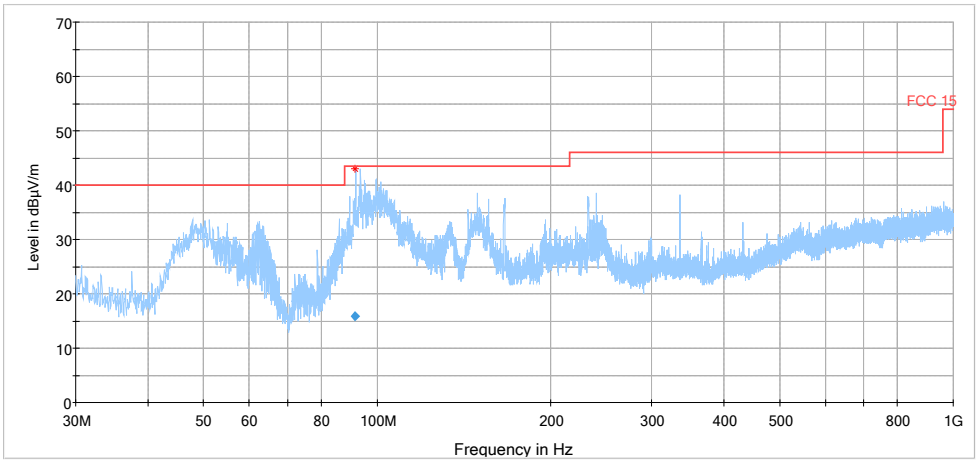
Plot #19 Radiated Emissions: 18-26 GHz		
Modulation: BT LE	Channel: Mid	

Disclaimer: Any measurement data within 2dB from the limit line is conditional PASS/FAIL due to measurement uncertainty considerations.



Plot #20 Radiated Emissions: 30 MHz – 1GHz		
Modulation: BT LE	Channel: High	

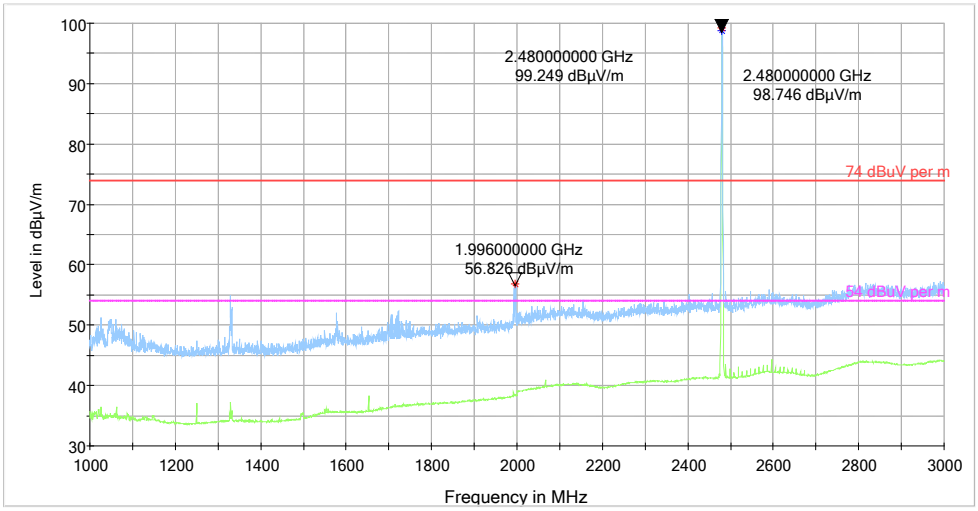
Disclaimer: Any measurement data within 2dB from the limit line is conditional PASS/FAIL due to measurement uncertainty considerations.



Plot #21 Radiated Emissions: 1-3 GHz and Restricted Bands

Modulation: BT LE	Channel: High	

Disclaimer: Any measurement data within 2dB from the limit line is conditional PASS/FAIL due to measurement uncertainty considerations.



Note: The peak signal above is the transmit channel.

Plot #22 Radiated Emissions: 3-18 GHz

Modulation: BT LE | Channel: High

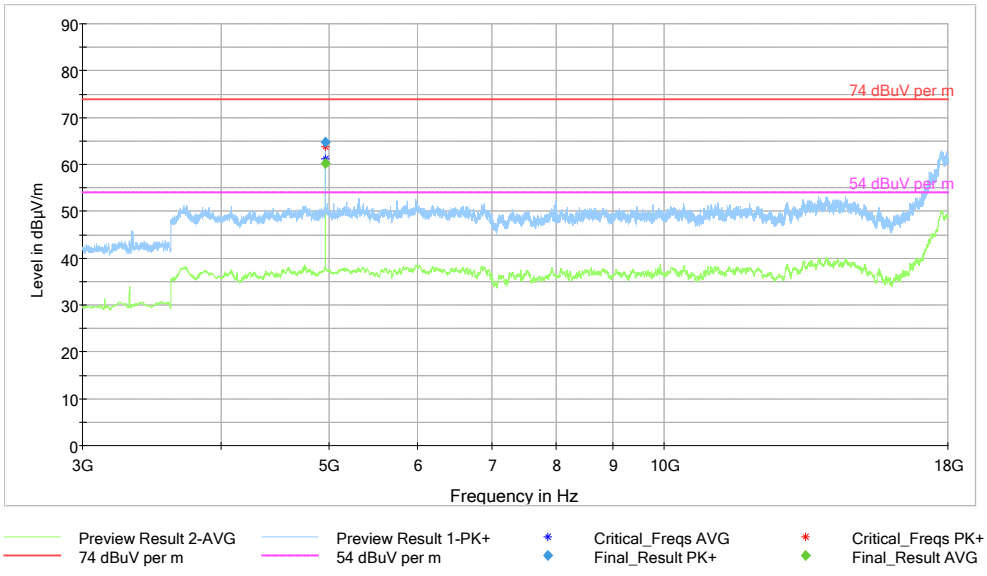
Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
4959.500000	64.82	---	74.00	9.18	100.0	1000.000	160.0	V	22.0
4960.000000	---	60.22	54.00	-6.22	100.0	1000.000	140.0	V	20.0

(continuation of the "Final_Result" table from column 15 ...)

Frequency (MHz)	Corr. (dB)	Comment
4959.500000	-20.5	7:48:02 PM - 10/20/2017
4960.000000	-20.5	7:49:08 PM - 10/20/2017

Disclaimer: Any measurement data within 2dB from the limit line is conditional PASS/FAIL due to measurement uncertainty considerations.



8.3 AC Power Line Conducted Emissions

8.3.1 Measurement according to ANSI C63.10 (2013)

Analyzer Settings:

- RBW = 9 KHz (CISPR Bandwidth)
- Detector: Peak / Average for Pre-scan
- Quasi-Peak/Average for Final Measurements

8.3.2 Limits: §15.207 & RSS-Gen 8.8

FCC §15.207(a) & RSS-Gen 8.8

- Except as shown in paragraphs (b) and (c) of this section of the CFR, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table (1), as measured using a 50 μH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between frequency ranges.

Frequency of emission (MHz)	**Conducted limit (dBμV)**	
	Quasi-peak	Average
0.15–0.5	66 to 56*	56 to 46*
0.5–5	56	46
5–30	60	50

*Decreases with the logarithm of the frequency.

8.3.3 Test conditions and setup:

Ambient Temperature ©	EUT Set-Up #	EUT operating mode	Power line (L1, L2, L3, N)	Power Input
22	2	3,4	Line & Neutral	120V / 60Hz

8.3.4 Measurement Result:

Plot #	Port	EUT Set-Up #:	EUT operating mode	Scan Frequency	Limit	Result
1	AC Mains	2	3	150 kHz – 30 MHz	See section 8.3.2	Pass
2	AC Mains	2	4	150 kHz – 30 MHz	See section 8.3.2	Pass

8.3.5 Measurement Plots:

Plot #1

EUT Information

EUT Name: Deki Reader V200
Manufacturer: FIO Corporation

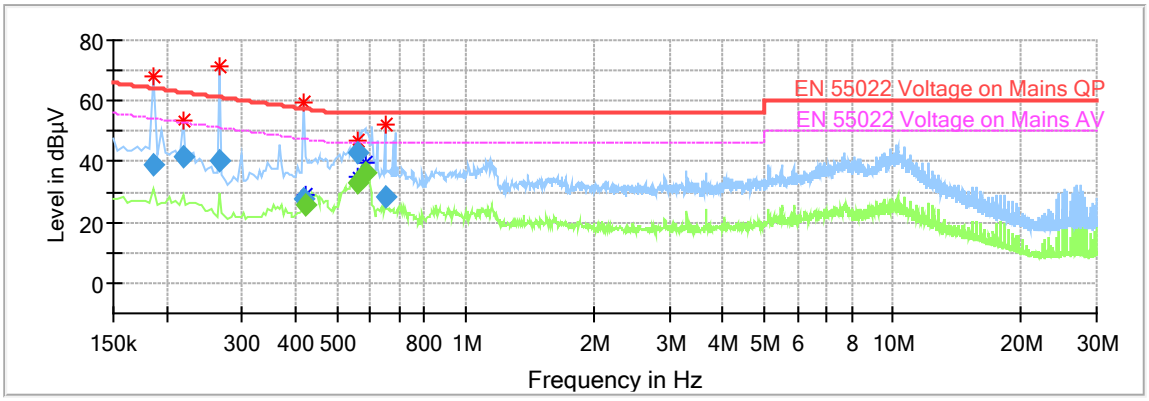
Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	PE	Corr. (dB)
0.186000	39.01	---	64.21	25.21	500.0	9.000	N	GND	10.4
0.218000	41.75	---	62.90	21.15	500.0	9.000	N	GND	10.6
0.266000	40.37	---	61.24	20.87	500.0	9.000	L1	GND	10.5
0.418000	27.43	---	57.49	30.06	500.0	9.000	L1	GND	10.3
0.422000	---	25.84	47.41	21.57	500.0	9.000	N	GND	10.3
0.558000	---	33.06	46.00	12.94	500.0	9.000	N	GND	10.3
0.558000	42.93	---	56.00	13.07	500.0	9.000	N	GND	10.3
0.582000	---	36.21	46.00	9.79	500.0	9.000	N	GND	10.2
0.650000	28.60	---	56.00	27.40	500.0	9.000	L1	GND	10.3

(continuation of the "Final_Result" table from column 15 ...)

Frequency (MHz)	Comment
0.186000	5:07:37 PM - 11/8/2017
0.218000	5:07:41 PM - 11/8/2017
0.266000	5:06:54 PM - 11/8/2017
0.418000	5:06:58 PM - 11/8/2017
0.422000	5:07:47 PM - 11/8/2017
0.558000	5:07:50 PM - 11/8/2017
0.558000	5:07:45 PM - 11/8/2017
0.582000	5:07:53 PM - 11/8/2017
0.650000	5:07:02 PM - 11/8/2017

Disclaimer: Any measurement data within 2dB from the limit line is conditional PASS/FAIL due to measurement uncertainty considerations.



Preview Result 2-AVG
Critical_Freqs AVG
EN 55022 Voltage on Mains QP
Final_Result QPK
Preview Result 1-PK+
Critical_Freqs PK+
EN 55022 Voltage on Mains AV
Final_Result AVG

Plot #2

EUT Information

EUT Name: Deki Reader V200
Manufacturer: FIO Corporation

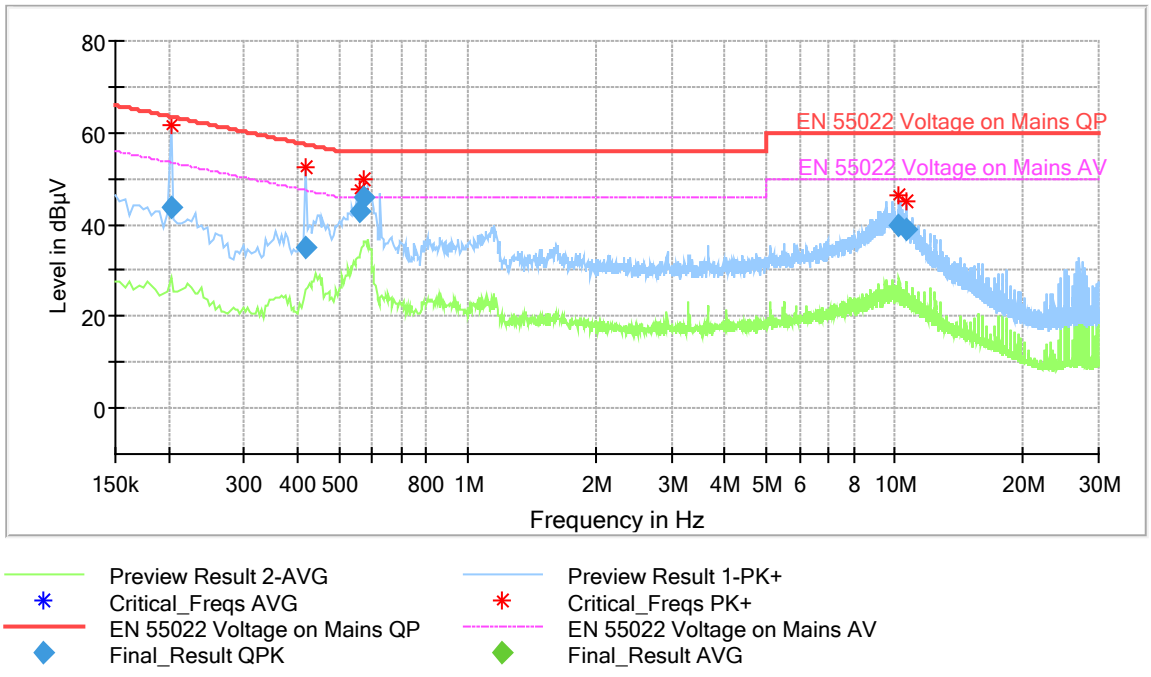
Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	PE	Corr. (dB)
0.202000	43.74	---	63.53	19.79	500.0	9.000	N	GND	10.6
0.418000	34.83	---	57.49	22.66	500.0	9.000	N	GND	10.4
0.558000	42.93	---	56.00	13.07	500.0	9.000	N	GND	10.3
0.574000	45.83	---	56.00	10.17	500.0	9.000	N	GND	10.2
10.242000	39.61	---	60.00	20.39	500.0	9.000	L1	GND	10.6
10.610000	39.03	---	60.00	20.97	500.0	9.000	L1	GND	10.6

(continuation of the "Final_Result" table from column 15 ...)

Frequency (MHz)	Comment
0.202000	5:19:21 PM - 11/8/2017
0.418000	5:19:25 PM - 11/8/2017
0.558000	5:19:29 PM - 11/8/2017
0.574000	5:19:33 PM - 11/8/2017
10.242000	5:18:51 PM - 11/8/2017
10.610000	5:18:55 PM - 11/8/2017

Disclaimer: Any measurement data within 2dB from the limit line is conditional PASS/FAIL due to measurement uncertainty considerations.



9 Test setup photos

Setup photos are included in supporting file name: "EMC_FIOIN-002-17001_FCC_15.247_Setup_Photos.pdf"

10 Test Equipment And Ancillaries Used For Testing

Item Name	Equipment Type	Manufacturer	Model	Serial #	Calibration Cycle	Last Calibration Date
Antenna Biconilog 3142E	Biconlog Antenna	EMCO	3142E	166067	3 years	6/27/2017
Active Loop 6507	Loop Antenna	ETS Lindgren	6507	00161344	3 years	2/13/2015
Antenna Horn 3115	Horn Antenna	EMCO	3115	35111	3 years	11/17/2015
Antenna Horn 3116	Horn Antenna	ETS Lindgren	3116	70497	3 years	7/22/2015
Digital Barometer	Compact Digital Barometer	Control Company	35519-055	91119547	3 Years	6/8/2017
CMU 200	Universal Communication Tester	R&S	CMU 200	110229	3 years	5/18/2017
FSU	Spectrum Analyzer	R&S	FSU	200302	2 Years	7/5/2017
ESU	EMI Test Receiver	R&S	ESU	1302.6005K40 -100251-KB	2 years	7/10/2017
Thermometer Humidity TM320	Thermometer Humidity	Dickson	AY1072	0528	1 Year	11/2/2016

Note:

1. Equipment used meets the measurement uncertainty requirements as required per applicable standards for 95% confidence levels. Calibration due dates, unless defined specifically, falls on the last day of the month. Items indicated "N/A" for cal status either do not specifically require calibration or is internally characterized before use.

11 Revision History

Date	Report Name	Changes to report	Report prepared by
11/10/2017	EMC_FIOIN-002-17001_FCC_15.247_BT	Initial Version	Cindy Li