

Test Report No.:
FCC2021-0005-2

RF Test Report

EUT : Charging Base
MODEL : DS206
BRAND NAME : N/A
CLIENT : Shenzhen Eview GPS
Technology
Classification Of Test : Commission Test

Vkan Certification & Testing Co., Ltd.



Test Report No.: FCC2021-0005-2		Page 2 of 60	
Client		Name : Shenzhen Eview GPS Technology Address : Rm 201, building 1-A, Nankechuang Yuangu, Dalang, Longhua District, Shenzhen, China	
Manufacturer		Name : Shenzhen Eview GPS Technology Address : Rm 201, building 1-A, Nankechuang Yuangu, Dalang, Longhua District, Shenzhen, China	
Equipment Under Test		Name : Charging Base Model/Type: DS206 Trade mark :N/A SerialNO.:N/A Sampe NO.:1-1	
Date of Receipt.	2021.03.24	Date of Testing	2021.03.24~2021.05.11
Test Specification		Test Result	
FCC Part 15, Subpart C, Section 15.247		PASS	
Evaluation of Test Result		The equipment under test was found to comply with the requirements of the standards applied. Issue Date: 2021.05.11	
Tested by: <u>Zhu Yu Lin</u> <u>Zhu Yu Lin</u> Name Signature		Reviewed by: <u>Cheng Xiaochuan</u> <u>Cheng Xiao Chuan</u> Name Signature	Approved by: <u>Dong Sanbi</u> <u>Dong San Bi</u> Name Signature
Other Aspects: NONE.			
Abbreviations:OK, Pass= passed Fail = failed N/A= not applicable EUT= equipment, sample(s) under tested This test report relates only to the EUT, and shall not be reproduced except in full, without written approval of CVC.			



TABLE OF CONTENTS

RELEASE CONTROL RECORD.....	5
1 GENERAL INFORMATION.....	6
1.1 GENERAL PRODUCT INFORMATION.....	6
1.2 OTHER INFORMATION.....	7
1.3 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL.....	8
1.4 GENERAL DESCRIPTION OF APPLIED STANDARDS.....	10
1.5 DESCRIPTION OF SUPPORT UNITS.....	10
2 SUMMARY OF TEST RESULTS.....	11
2.1 LIST OF TEST AND MEASUREMENT INSTRUMENTS.....	11
2.2 MEASUREMENT UNCERTAINTY.....	11
2.3 TEST LOCATION.....	11
3 TEST TYPES AND RESULTS.....	12
3.1 CONDUCTED EMISSION MEASUREMENT.....	12
3.1.1 Limit.....	12
3.1.2 Measurement procedure.....	12
3.1.3 Test setup.....	12
3.1.4 Test results.....	13
3.2 RADIATED EMISSION AND BANDEDGE MEASUREMENT.....	15
3.2.1 Limit.....	15
3.2.2 Measurement procedure.....	15
3.2.3 Test setup.....	16
3.2.4 Test results.....	18
3.3 6dB BANDWIDTH MEASUREMENT.....	21
3.3.1 Limits.....	21
3.3.2 Measurement procedure.....	21
3.3.3 Test setup.....	21
3.3.4 Test result.....	22
3.4 CONDUCTED OUTPUT POWER.....	23
3.4.1 Limits.....	23
3.4.2 Measurement procedure.....	23
3.4.3 Test setup.....	23
3.4.4 Test result.....	24
3.5 POWER SPECTRAL DENSITY MEASUREMENT.....	25
3.5.1 Limits.....	25
3.5.2 Measurement procedure.....	25
3.5.3 Test setup.....	25
3.5.4 Test result.....	26
3.6 OUT OF BAND EMISSION MEASUREMENT.....	27
3.6.1 Limits.....	27
3.6.2 Measurement procedure.....	27
3.6.3 Test setup.....	27
3.6.4 Test result.....	28
4 PHOTOGRAPHS OF TEST SETUP.....	29
5 APPENDIX A TEST RESULTS.....	30
5.1 RADIATED EMISSION AND BANDEDGE MEASUREMENT.....	31
5.1.1 Test Result.....	31
5.2 DTS BANDWIDTH.....	47
5.2.1 Test Result.....	47
5.3 OCCUPIED CHANNEL BANDWIDTH.....	50



5.3.1 Test Result.....50

5.4 MAXIMUM CONDUCTED OUTPUT POWER.....53

5.4.1 Test Result.....53

5.5 MAXIMUM POWER SPECTRAL DENSITY.....54

5.5.1 Test Result.....54

Test Graphs.....54

5.6 BAND EDGE MEASUREMENTS.....55

5.6.1 Test Result.....55

Test Graphs.....55

5.7 CONDUCTED SPURIOUS EMISSION.....56

5.7.1 Test Result.....56

APPENDIX B.....59



RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
FCC2021-0005-2	Original release	2021.05.11



1 GENERAL INFORMATION

1.1 GENERAL PRODUCT INFORMATION

PRODUCT	Charging Base
BRAND	N/A
MODEL	DS206
ADDITIONAL MODEL	N/A
FCC ID	2AUMJDS206MA21
POWER SUPPLY	DC 5V From USB
MODULATIONTECHNOLOGY	DTS
MODULATION TYPE	GFSK for DTS
OPERATING FREQUENCY	2402MHz ~ 2480MHz for BT-LE(GFSK)
NUMBER OF CHANNEL	BT-LE GFSK (1 Mbps): 40
PeakOutPut POWER	BT-LE: 2.55dBm (Maximum)
ANTENNA TYPE	Cable Antenna, 1dBi Gain
I/O PORTS	Refer to user's manual
CABLE SUPPLIED	USB Line,1.2m, Detachable, Unshielded

Remark:

1. For more detailed features description, please refer to the manufacturer's specifications or the User's Manual.
2. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.
3. Please refer to the EUT photo document for detailed product photo.

1.2 OTHER INFORMATION

Operating frequency of each channel

BT-LE(1 Mbps)							
CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)
0	2402	10	2422	20	2442	30	2462
1	2404	11	2424	21	2444	31	2464
2	2406	12	2426	22	2446	32	2466
3	2408	13	2428	23	2448	33	2468
4	2410	14	2430	24	2450	34	2470
5	2412	15	2432	25	2452	35	2472
6	2414	16	2434	26	2454	36	2474
7	2416	17	2436	27	2456	37	2476
8	2418	18	2438	28	2458	38	2478
9	2420	19	2440	29	2460	39	2480

Note:

- The channels which were indicated in bold type of the above channel list were selected as representative test channel. Therefore only the data of the test channels were recorded in this report.

1.3 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

Pre-scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, xyz axis and antenna ports

EUT CONFIGURE MODE	APPLICABLE TEST ITEMS				DESCRIPTION
	RE<1G	RE≥1G	PLC	APCM	
A	√	√	√	√	BT-LE Function

Where **RE<1G**: Radiated Emission below 1GHz **RE≥1G**: Radiated Emission above 1GHz
PLC: Power Line Conducted Emission **APCM**: Antenna Port Conducted Measurement

RADIATED EMISSION TEST (BELOW 1 GHz):

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, XYZ axis, antenna ports (if EUT with antenna diversity architecture) and packet type.
- ☒ The worst case was found when positioned on x axis for radiated emission. Following channel(s) was (were) selected for the final test as listed below:

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A	BT-LE	0 to 39	19	DTS	GFSK	1.0

For the test results, only the worst case was shown in test report.

RADIATED EMISSION TEST (ABOVE 1 GHz):

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, XYZ axis, antenna ports (if EUT with antenna diversity architecture) and packet type.
- ☒ The worst case was found when positioned on x axis for radiated emission. Following channel(s) was (were) selected for the final test as listed below:

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A	BT-LE	0 to 39	0, 19, 39	DTS	GFSK	1.0

POWER LINE CONDUCTED EMISSION TEST:

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, antenna ports (if EUT with antenna diversity architecture), and packet types.
- ☒ Following channel(s) was (were) selected for the final test as listed below.



EUT CONFIGURE MODE	TESTED CONDITION
-	BT Link

ANTENNA PORT CONDUCTED MEASUREMENT:

- ☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.
- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, antenna ports (if EUT with antenna diversity architecture), and packet types.
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A	BT-LE	0 to 39	0, 19, 39	DTS	GFSK	1.0

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	TEST VOLTAGE (SYSTEM)	TESTED BY
RE<1G	25deg. C, 55%RH	DC 5V	Zhu Yu Lin
RE≥1G	25deg. C, 55%RH	DC 5V	Zhu Yu Lin
PLC	25deg. C, 59%RH	DC 5V From Adapter input AC120V/60Hz	Zhu Yu Lin
APCM	25deg. C, 60%RH	DC 5V	Zhu Yu Lin



1.4 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF product, according to the specifications of the manufacturers. It must comply with the requirements of the following standards:

FCC PART 15, Subpart C. Section 15.247
KDB 558074 D01 15.247 Meas Guidance v05r02
ANSI C63.10-2013

All test items have been performed and recorded as per the above standards

1.5 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Support Equipment							
NO	Description	Brand	Model No.	Serial Number	Supplied by		
1	Adapter	Apple	A1443	101290	Lab		
Support Cable							
NO	Description	Quantity (Number)	Length (cm)	Detachable (Yes/ No)	Shielded (Yes/ No)	Cores (Number)	Supplied by
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

PPLIED STANDARD: FCC Part 15, Subpart C			
STANDARD SECTION	TEST TYPE AND LIMIT	RESULT	REMARK
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit.
15.247(d) 15.209	Radiated Emissions	PASS	Meet the requirement of limit.
15.247(d)	Band Edge Measurement	PASS	Meet the requirement of limit.
15.247(a)(2)	6dB bandwidth	PASS	Meet the requirement of limit.
15.247(b)	Conducted Output power	PASS	Meet the requirement of limit.
15.247(e)	Power Spectral Density	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	Meet the requirement of limit.

2.1 LIST OF TEST AND MEASUREMENT INSTRUMENTS

Refer to Appendix A.

2.2 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

No.	ITEM	FREQUENCY	UNCERTAINTY
1	Conducted emissions	9kHz~30MHz	2.7dB
2	Radiated emissions	9KHz ~ 30MHz	5.6dB
		30MHz ~ 1GMHz	4.6dB
		1GHz ~ 18GHz	4.4dB
		18GHz ~ 40GHz	4.6dB

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

2.3 TEST LOCATION

The tests and measurements refer to this report were performed by EMC testing Lab. of CVC Testing Technology Co., Ltd.
No.3, Tiantaiyi Road, Kaitai Avenue, Science City, Guangdong, China
Test Firm Registration Number: 937273

3 TEST TYPES AND RESULTS

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 Limit

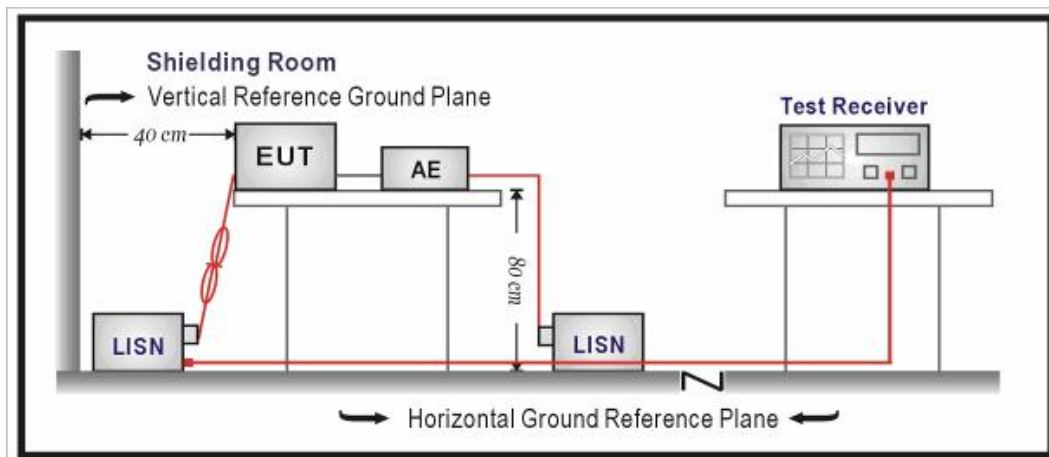
Frequency (MHz)	Conducted Limits(dBμV)	
	Quasi-peak	Average
0.15 - 0.5	66 to 56 *	56 to 46*
0.5 - 5	56	46
5 - 30	60	50

NOTE: 1. The lower limit shall apply at the transition frequencies.
NOTE: 2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

3.1.2 Measurement procedure

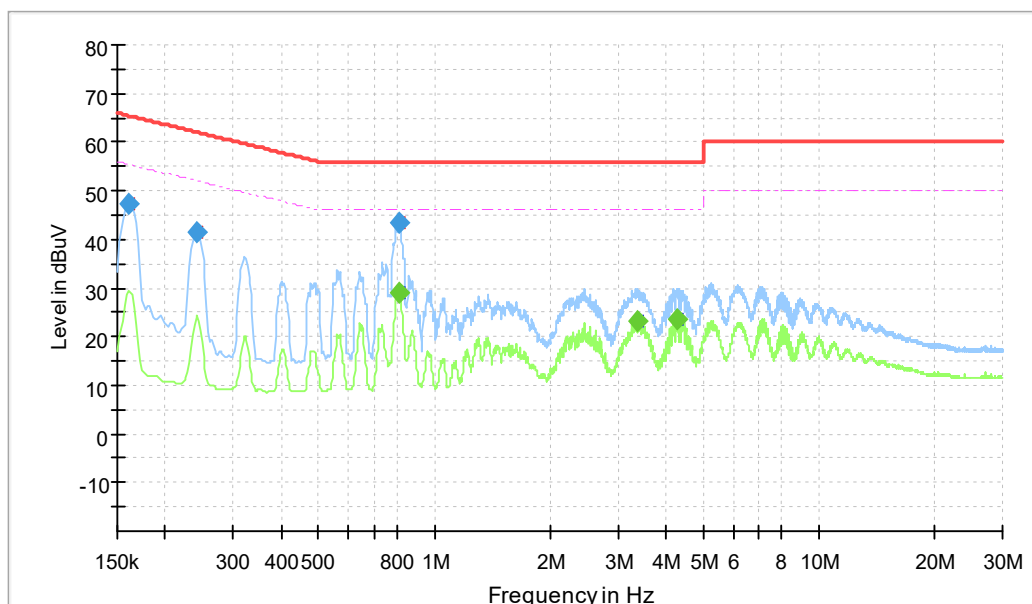
- The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The vertical conducting plane was located 40 cm to the rear of the EUT. All other surfaces of EUT were at least 80 cm from any other grounded conducting surface. The EUT and simulators are connected to the main power through a line impedance stabilization network (LISN). The LISN provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN. (Please refer to the Test photographs) Each current-carrying conductor of the EUT power cord, except the ground (safety) conductor, was individually connected through a LISN to the input power source. The equipment under test shall be placed on a support of non-metallic material, the height of which shall be 1.5m above the ground,
- The excess length of the power cord between the EUT and the LISN receptacle were folded back and forth at the center of the lead to form a bundle not exceeding 40 cm in length.
- Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9 kHz.

3.1.3 Test setup



3.1.4 Test results

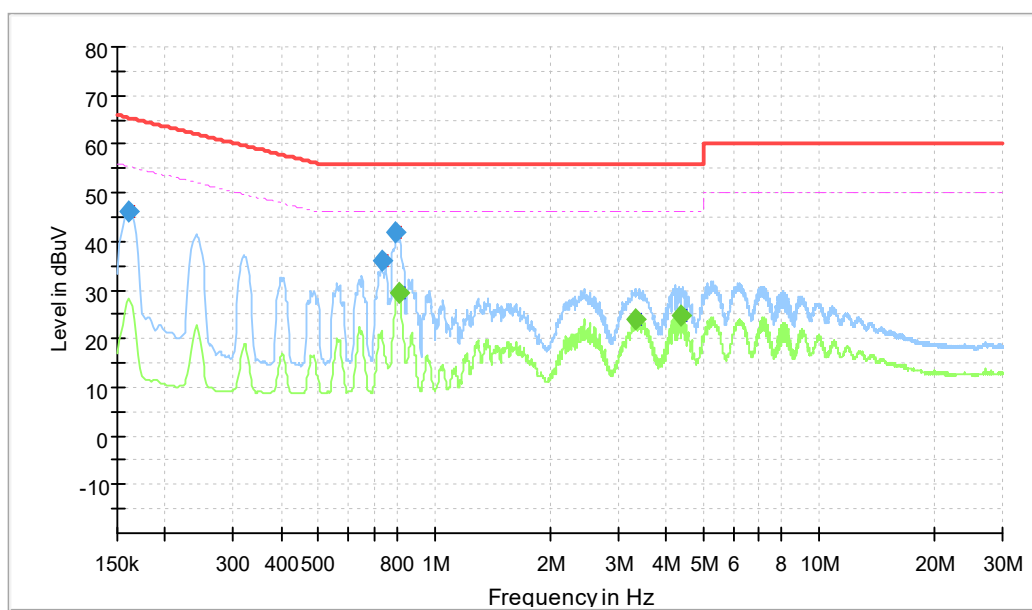
Test Mode	BT Link	Channel	CH 39
Frequency Range	150KHz ~ 30MHz	PHASE	Line (L)



NO.	Frequency (MHz)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Corr. (dB)	Remark
1	0.161	47.4	65.4	18.0	19.5	QP
2	0.242	41.6	62.0	20.4	19.5	QP
3	0.812	29.1	46.0	16.9	19.6	AVG
4	0.814	43.3	56.0	12.7	19.6	QP
5	3.356	23.2	46.0	22.8	19.6	AVG
6	4.290	23.7	46.0	22.3	19.6	AVG

Remark: The emission levels of other frequencies were very low against the limit.

Test Mode	BT Link	Channel	CH 39
Frequency Range	150KHz ~ 30MHz	PHASE	Line (N)



NO.	Frequency (MHz)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Corr. (dB)	Remark
1	0.161	46.1	65.4	19.3	19.5	QP
2	0.731	36.1	56.0	19.9	19.6	QP
3	0.796	41.7	56.0	14.3	19.6	QP
4	0.809	29.3	46.0	16.7	19.6	AVG
5	3.347	24.0	46.0	22.0	19.6	AVG
6	4.358	24.8	46.0	21.2	19.7	AVG

Remark: The emission levels of other frequencies were very low against the limit.

3.2 RADIATED EMISSION AND BANDEDGE MEASUREMENT

3.2.1 Limit

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a).

FREQUENCIES (MHz)	FIELD STRENGTH (Microvolts/Meter)	MEASUREMENT DISTANCE (Meters)
0.009 ~ 0.490	2400/F(kHz)	300
0.490 ~ 1.705	24000/F(kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

NOTE: 1. The lower limit shall apply at the transition frequencies.

NOTE: 2. Emission level (dBuV/m) = 20 log Emission level (uV/m).

NOTE: 3. As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

3.2.2 Measurement procedure

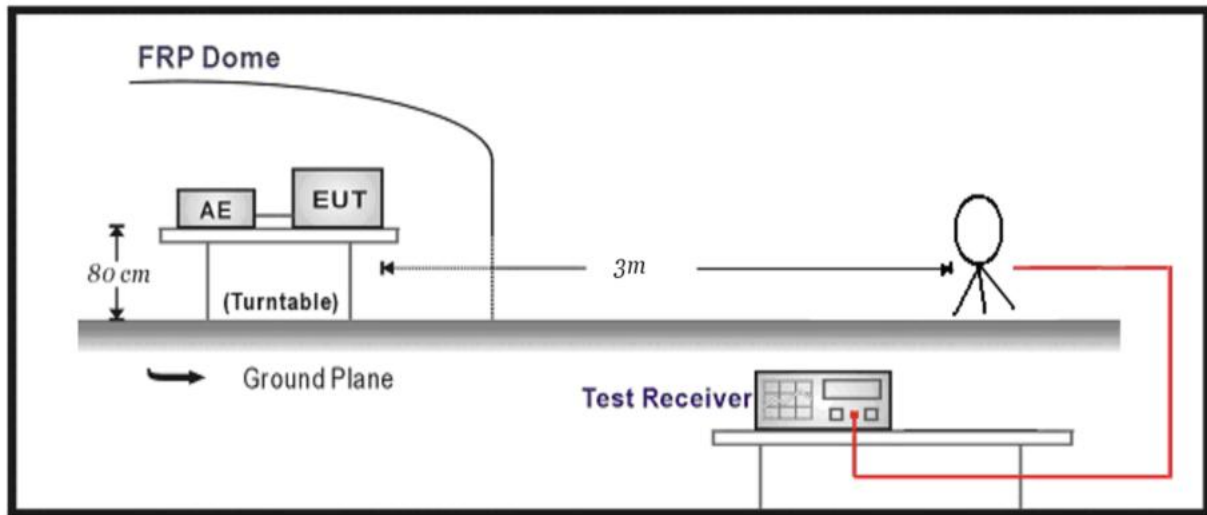
- The EUT was placed on the top of a rotating table 1.5 meters(above 1GHz) and 0.8 meters(below 1GHz) above the ground at a 3 meters semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- For below 1GHz was used bilog antenna, and above 1GHz was used horn antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- For below 30MHz, a loop antenna with its vertical plane is place 3m from the EUT and rotated about its vertical axis for maximum response at each azimuth about the EUT. And the centre of the loop shall be 1m above the ground.
- During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, For battery operated equipment, the equipment tests shall be perform using fresh batteries. The turntable was rotated to maximize the emission level.

NOTE:

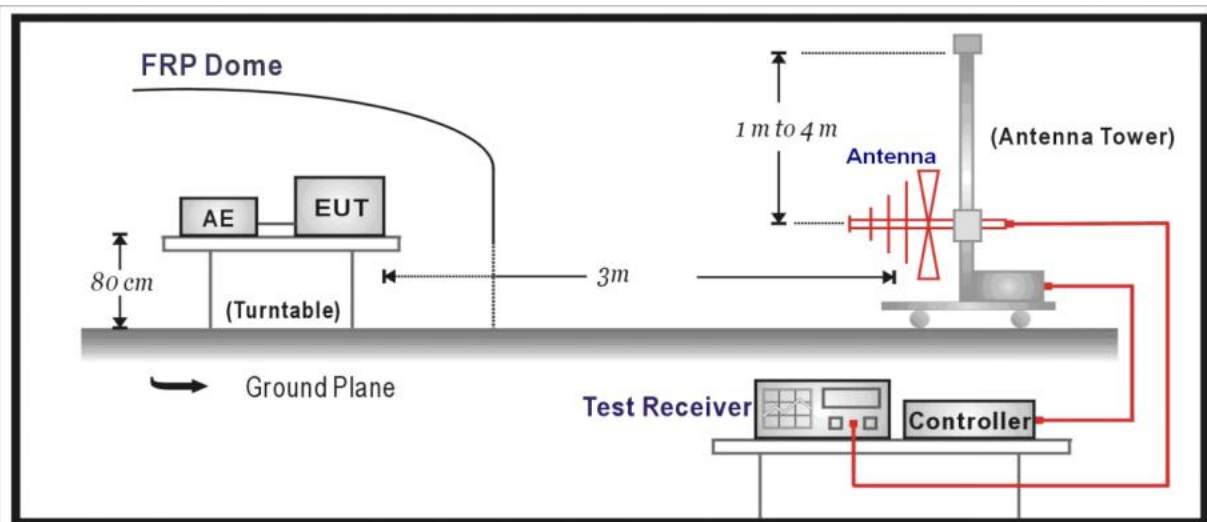
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is $\geq 1/T$ (Duty cycle < 98%) or 10Hz(Duty cycle > 98%) for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.
5. The testing of the EUT was performed on all 3 orthogonal axes; the worst-case test configuration was reported on the file test setup photo.

3.2.3 Test setup

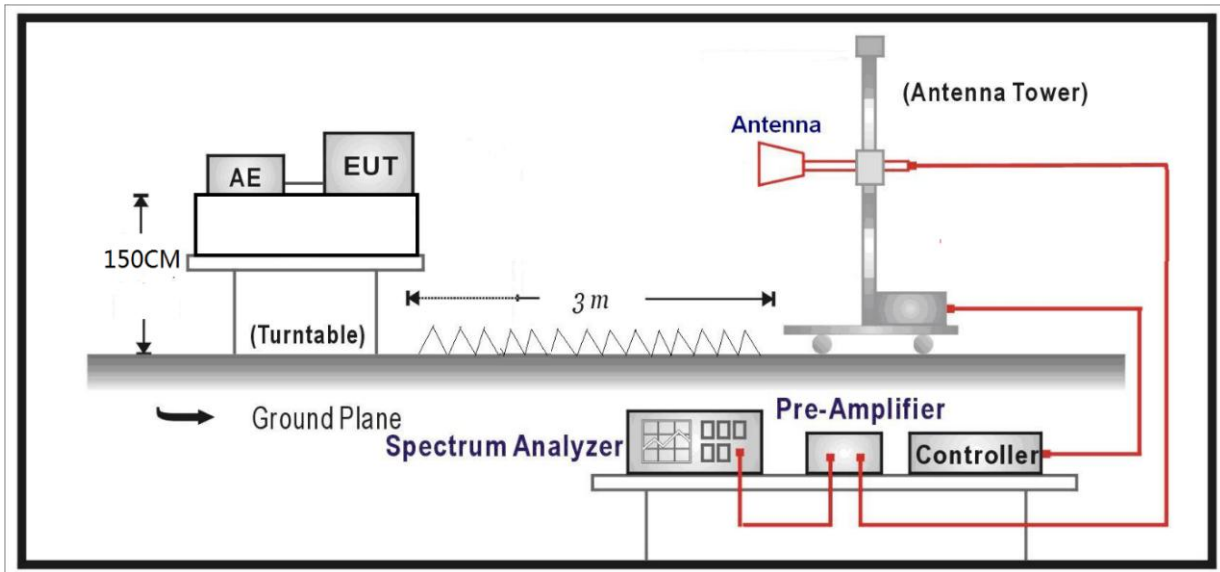
Below 30MHz Test Setup:



Below 1GHz Test Setup:



Above 1GHz Test Setup:

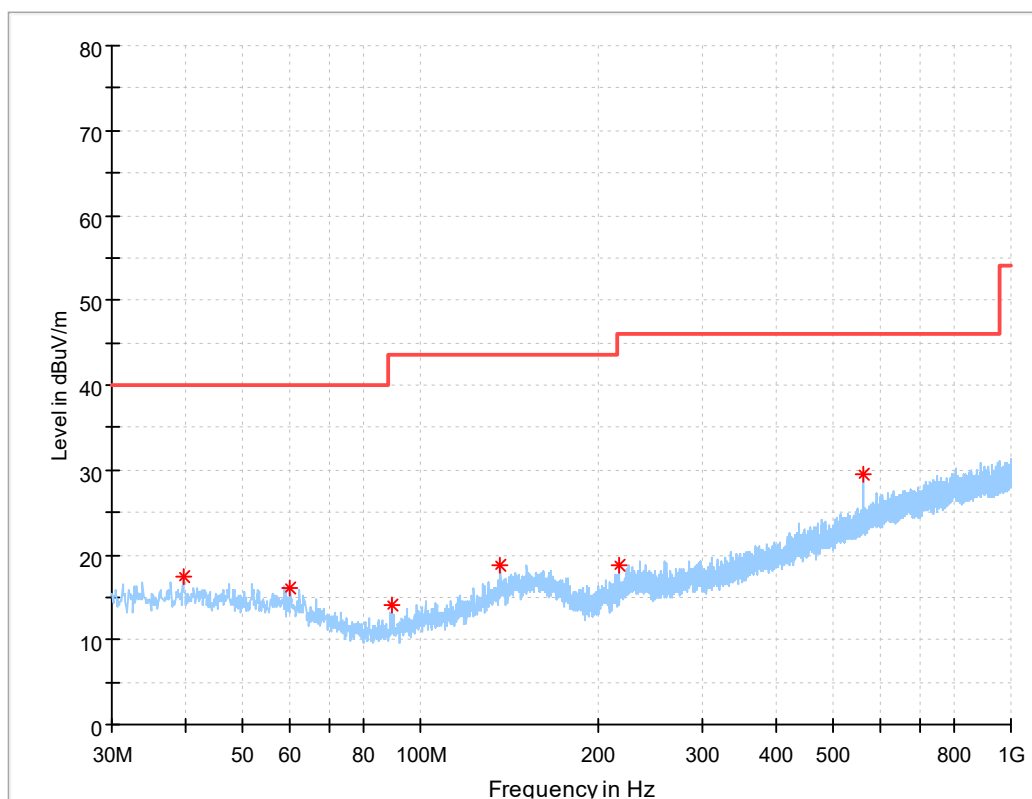


3.2.4 Test results

BELOW 1GHz WORST-CASE DATA:

Test Mode	BT-LE (GFSK)	Worst Test Channel	CH 19
Frequency Range	9KHz ~ 1GHz	Detector Function	Quasi-Peak (QP)

Horizontal



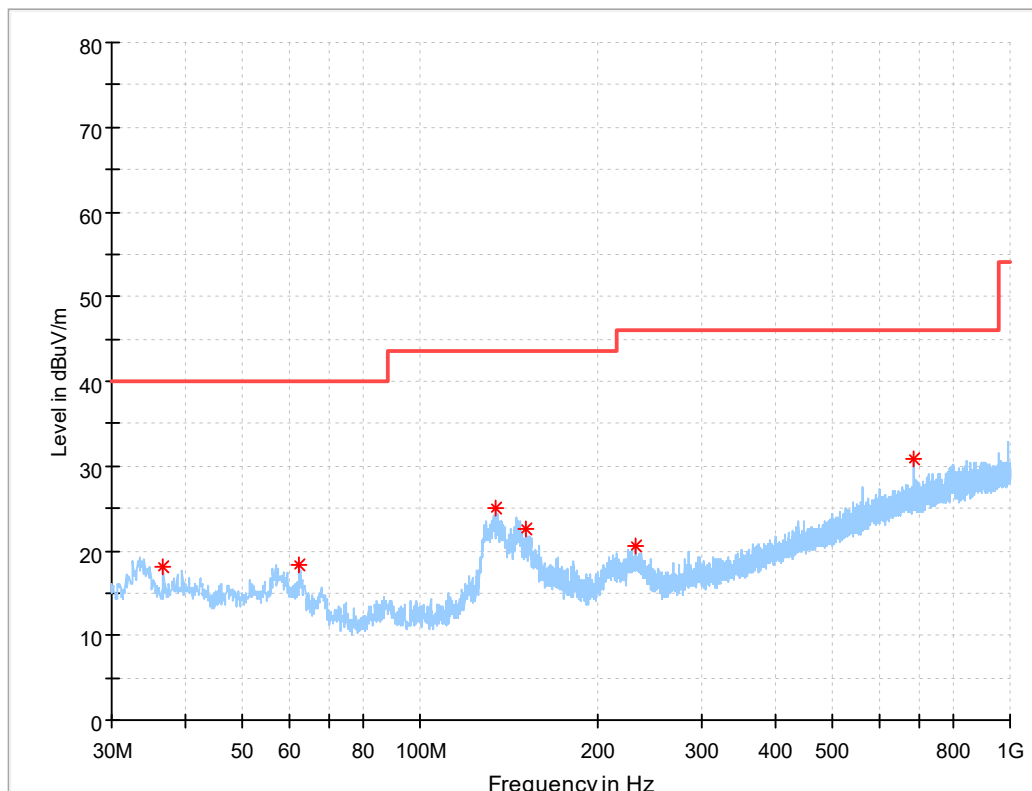
NO.	Frequency (MHz)	Result (dBm)	Limit (dBm)	Margin (dB)	Height (cm)	Azimuth (deg)	Remark
1	39.603	17.3	40.0	22.7	200.0	93.0	QP
2	60.264	16.1	40.0	23.9	100.0	19.0	QP
3	89.655	14.1	43.5	29.4	100.0	6.0	QP
4	136.700	18.7	43.5	24.8	300.0	301.0	QP
5	217.404	18.8	46.0	27.2	200.0	242.0	QP
6	562.627	29.5	46.0	16.5	100.0	93.0	QP

Remark: 1. 9KHz~30MHz have been test and test data more than 20dB margin.

2. The emission levels of other frequencies were greater than 20dB margin.

Test Mode	BT-LE (GFSK)	Worst Test Channel	CH 19
Frequency Range	9KHz ~ 1GHz	Detector Function	Quasi-Peak (QP)

Vertical



NO.	Frequency (MHz)	Result (dBm)	Limit (dBm)	Margin (dB)	Height (cm)	Azimuth (deg)	Remark
1	36.693	18.2	40.0	21.8	100.0	111.0	QP
2	62.301	18.3	40.0	21.7	100.0	334.0	QP
3	134.566	24.9	43.5	18.6	100.0	0.0	QP
4	151.541	22.6	43.5	20.9	100.0	33.0	QP
5	231.760	20.5	46.0	25.5	100.0	14.0	QP
6	687.660	30.7	46.0	15.3	100.0	308.0	QP

Remark: 1. 9KHz~30MHz have been test and test data more than 20dB margin.
2. The emission levels of other frequencies were greater than 20dB margin.



ABOVE 1GHz DATA:
Please refer Annex A.

3.3 6dB BANDWIDTH MEASUREMENT

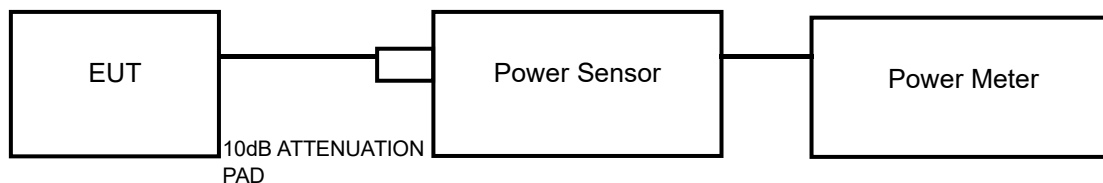
3.3.1 Limits

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

3.3.2 Measurement procedure

- Set resolution bandwidth (RBW) = 100KHz
- Set the video bandwidth (VBW) $\geq 3 \times$ RBW, Detector = Peak.
- Trace mode = max hold.
- Sweep = auto couple.
- Measure the maximum width of the emission that is constrained by the frequencies associated with the two amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

3.3.3 Test setup





3.3.4 Test result

Please refer Annex A.

3.4 CONDUCTED OUTPUT POWER

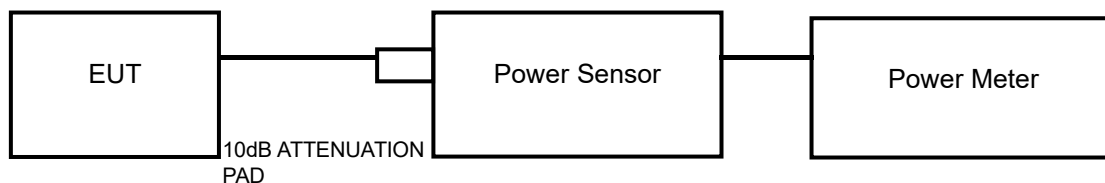
3.4.1 Limits

Forsystems using digital modulation in the 2400–2483.5 MHz band: 1 Watt (30dBm).

3.4.2 Measurement procedure

- A peak power sensor was used on the output port of the EUT. A power meter was used to read the response of the peak power sensor and set the detector to PEAK. Record the power level.
- An average power sensor was used on the output port of the EUT. A power meter was used to read the response of the average power sensor and set the detector to AVERAGE. Record the power level.

3.4.3 Test setup





3.4.4 Test result

Please refer Annex A.

3.5 POWER SPECTRAL DENSITY MEASUREMENT

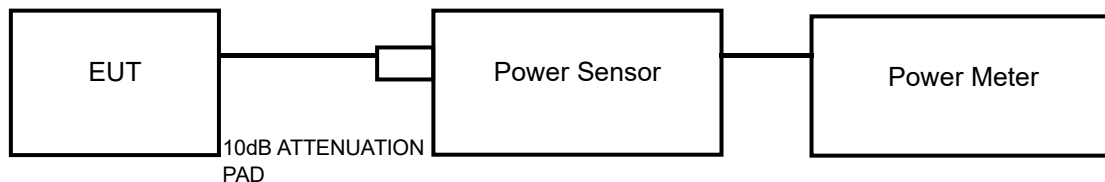
3.5.1 Limits

The Maximum of Power Spectral Density Measurement is 8dBm/3KHz.

3.5.2 Measurement procedure

- Set instrument center frequency to DTS channel center frequency.
- Set the span to 1.5 times the DTS bandwidth.
- Set RBW to: 3KHz
- Set VBW $\geq 3 \times$ RBW.
- Detector = peak
- Ensure that the number of measurement points in the sweep $\geq 2 \times$ span/RBW.
- Sweep time = auto couple.
- Use the peak marker function to determine the maximum amplitude level.

3.5.3 Test setup





3.5.4 Test result

Please refer Annex A.

3.6 OUT OF BAND EMISSION MEASUREMENT

3.6.1 Limits

Below -20dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

3.6.2 Measurement procedure

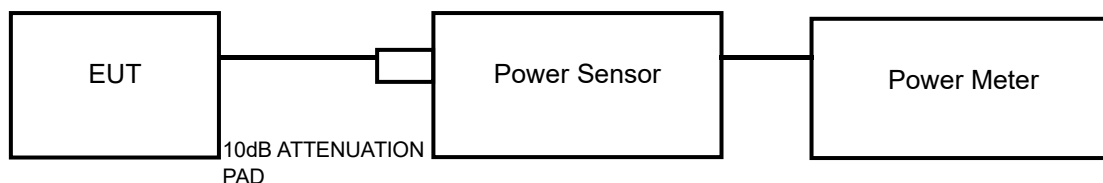
Measurement Procedure -Reference Level

- Set the RBW = 100 kHz.
- Set the VBW $\geq$ 300 kHz.
- Detector = peak.
- Sweep time = auto couple.
- Trace mode = max hold.
- Allow trace to fully stabilize.
- Use the peak marker function to determine the maximum power level in any 100 kHzband segment within the fundamental EBW.

Measurement Procedure –Unwanted Emission Level

- Set RBW = 100 kHz.
- Set VBW $\geq$ 300 kHz.
- Set span to encompass the spectrum to be examined
- Detector = peak.
- Trace Mode = max hold.
- Sweep = auto couple.

3.6.3 Test setup





3.6.4 Test result

Please refer Annex A.



4 PHOTOGRAPHS OF TEST SETUP

Please refer to the attached file (Test Setup Photo).

,



5 Appendix A Test Results

Please refer to the following pages for test results.

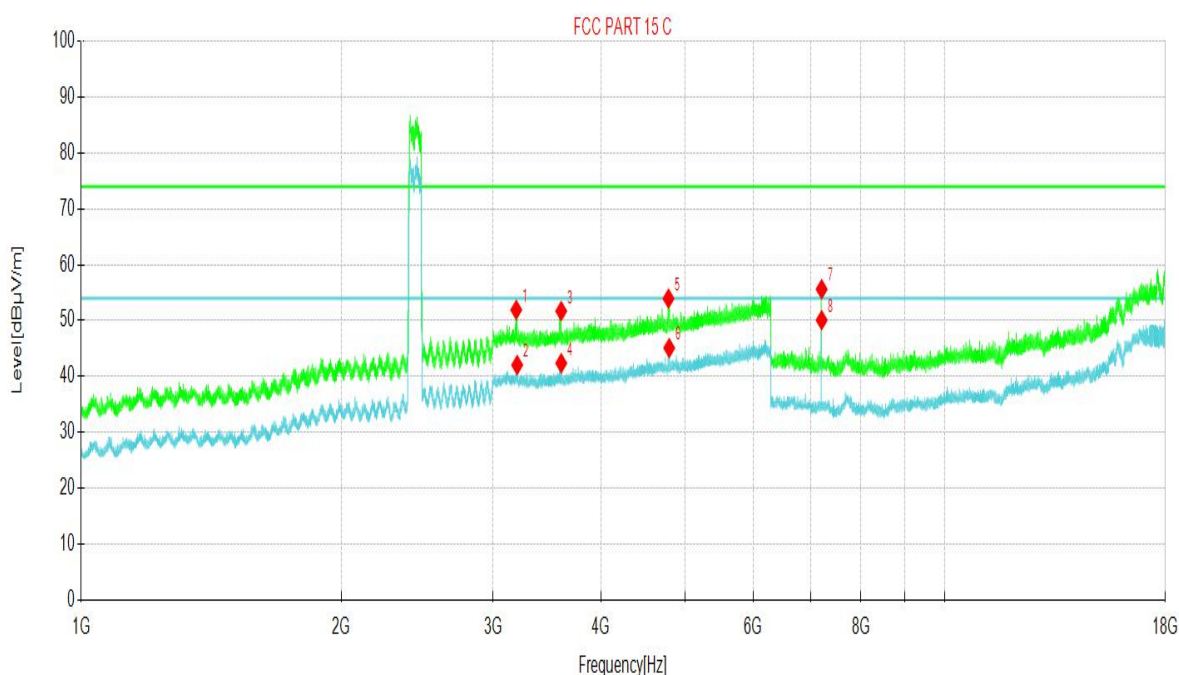
5.1 RADIATED EMISSION AND BANDEDGE MEASUREMENT

5.1.1 Test Result

Harmonic:
ABOVE 1GHz DATA

Mode:	BT-LE-CH0 -Base
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Test Graph



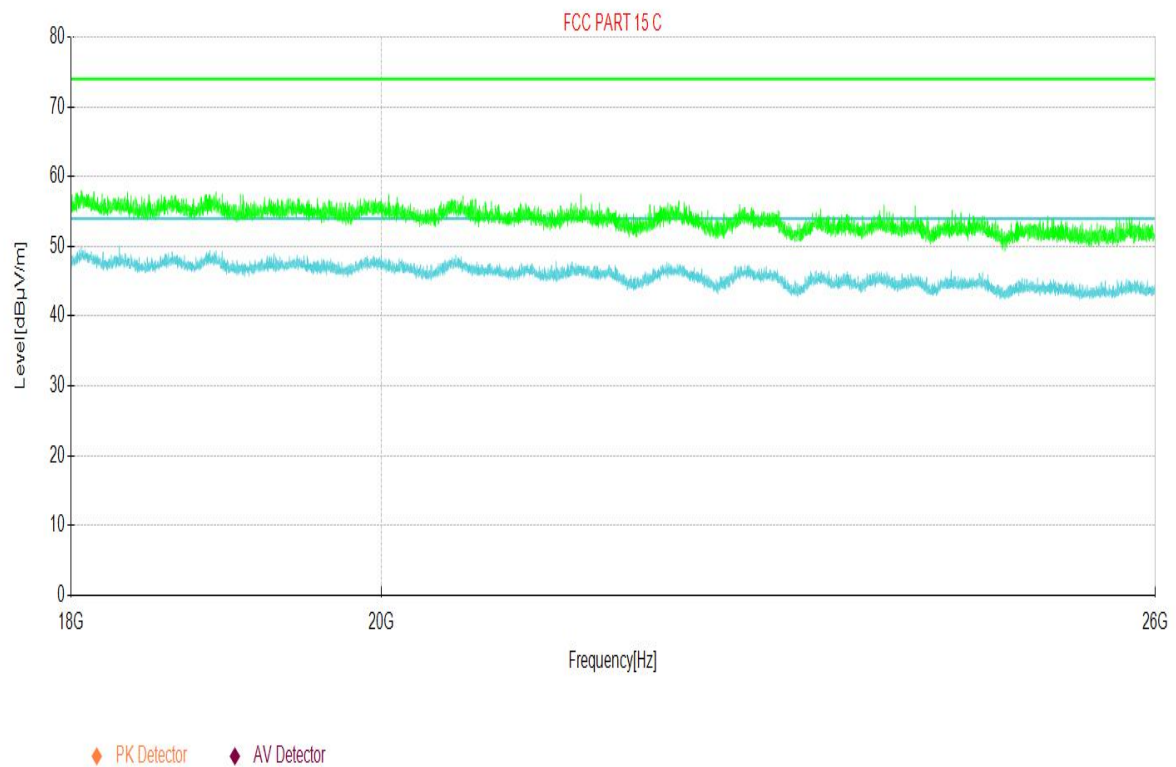
◆ PK Detector ◆ AV Detector

Suspected Data List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	3190.75	51.93	12.22	74.00	22.07	140	259	Horizontal
2	3198.67	42.05	12.48	54.00	11.95	170	264	Horizontal
3	3597.35	51.72	12.57	74.00	22.28	155	245	Horizontal
4	3597.35	42.38	12.57	54.00	11.62	150	251	Horizontal
5	4788.77	53.95	14.07	74.00	20.05	155	340	Horizontal
6	4798.01	45.10	14.05	54.00	8.90	180	359	Horizontal
7	7204.50	55.61	8.10	74.00	18.39	150	83	Horizontal
8	7204.50	50.09	8.10	54.00	3.91	140	92	Horizontal

Mode:	BT-LE-CH0-Base
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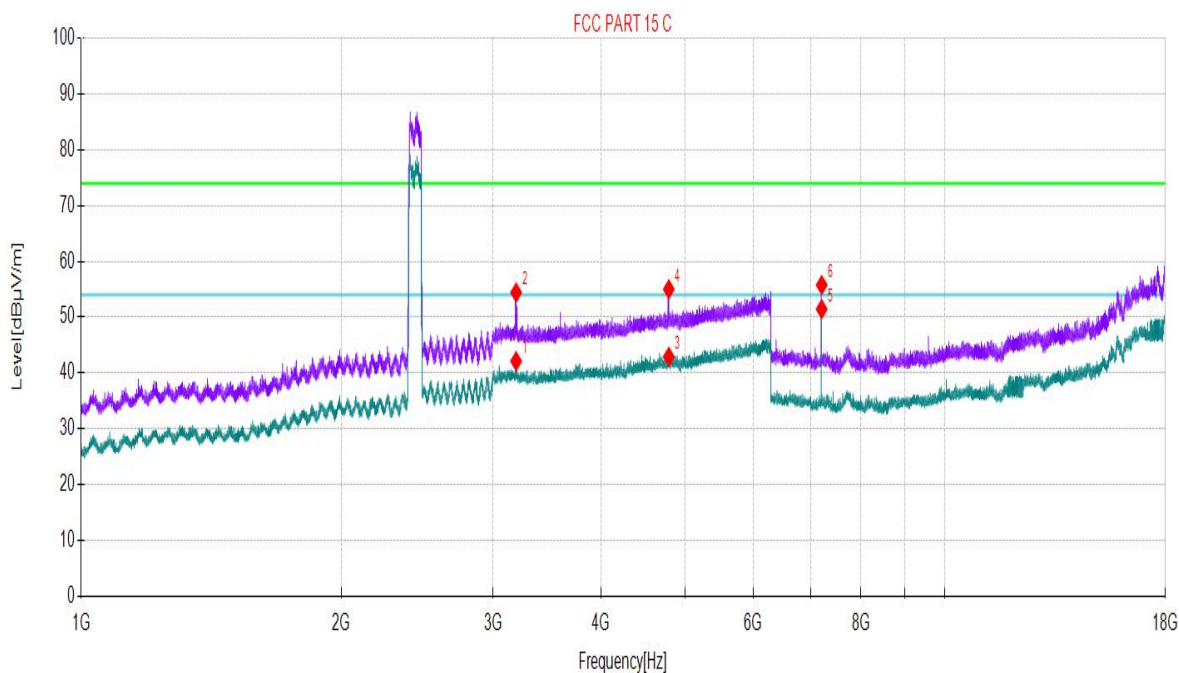
Test Graph



Mode:

BT-LE-CH0 -Base

Test Graph



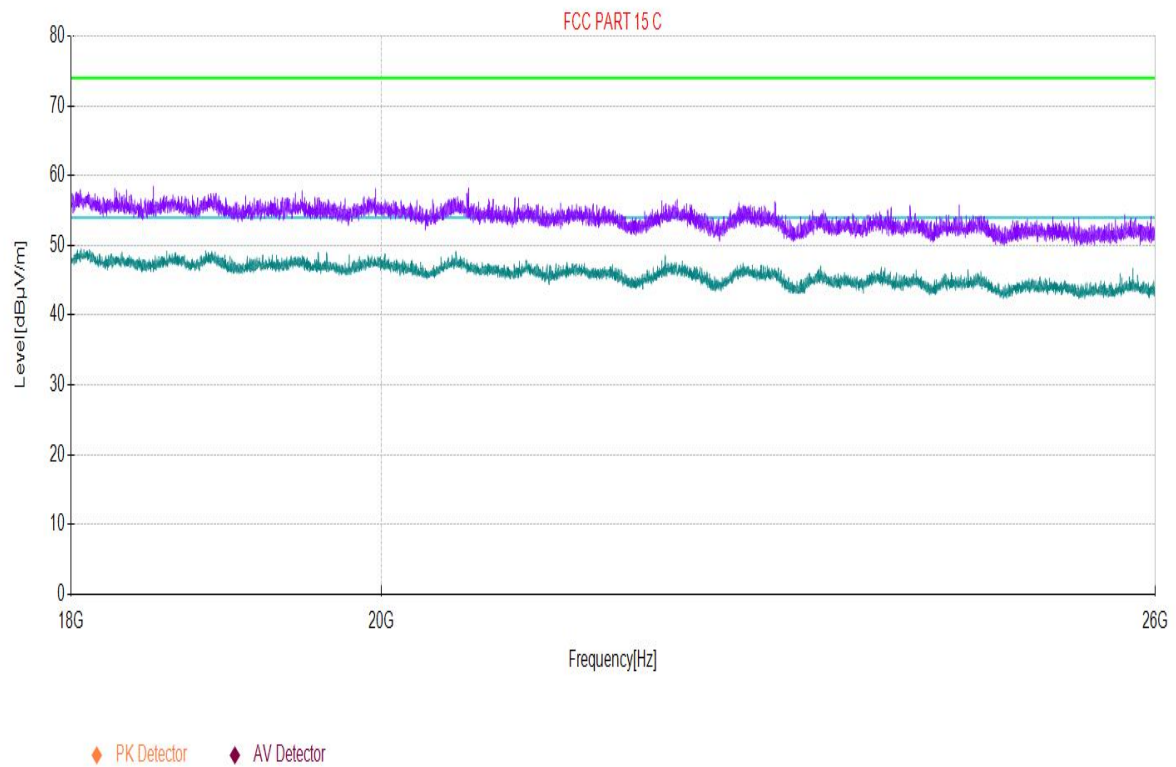
◆ PK Detector ◆ AV Detector

Suspected Data List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	3189.43	42.13	12.23	54.00	11.87	175	4	Vertical
2	3189.76	54.42	12.21	74.00	19.58	150	220	Vertical
3	4792.73	42.89	14.06	54.00	11.11	155	140	Vertical
4	4792.73	55.00	14.06	74.00	19.00	150	140	Vertical
5	7204.50	51.45	8.10	54.00	2.55	160	350	Vertical
6	7205.67	55.77	8.11	74.00	18.23	155	359	Vertical

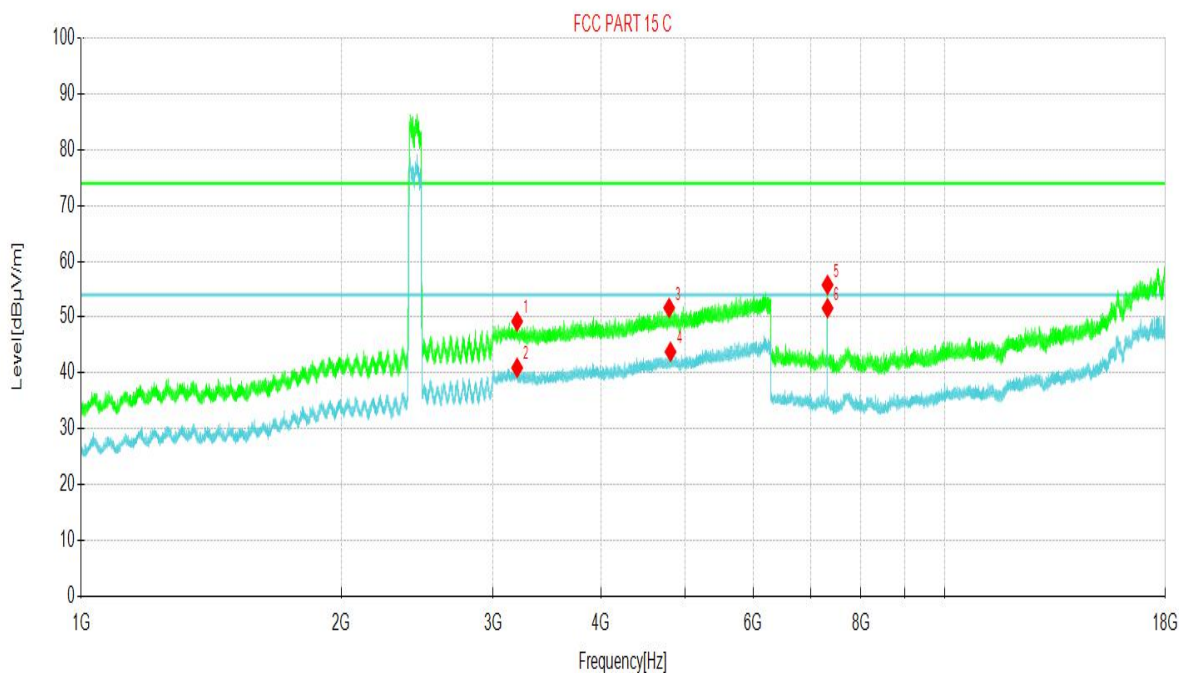
Mode:	BT-LE-CH0-Base
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Test Graph



Mode:	BT-LE-CH19 -Base
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Test Graph



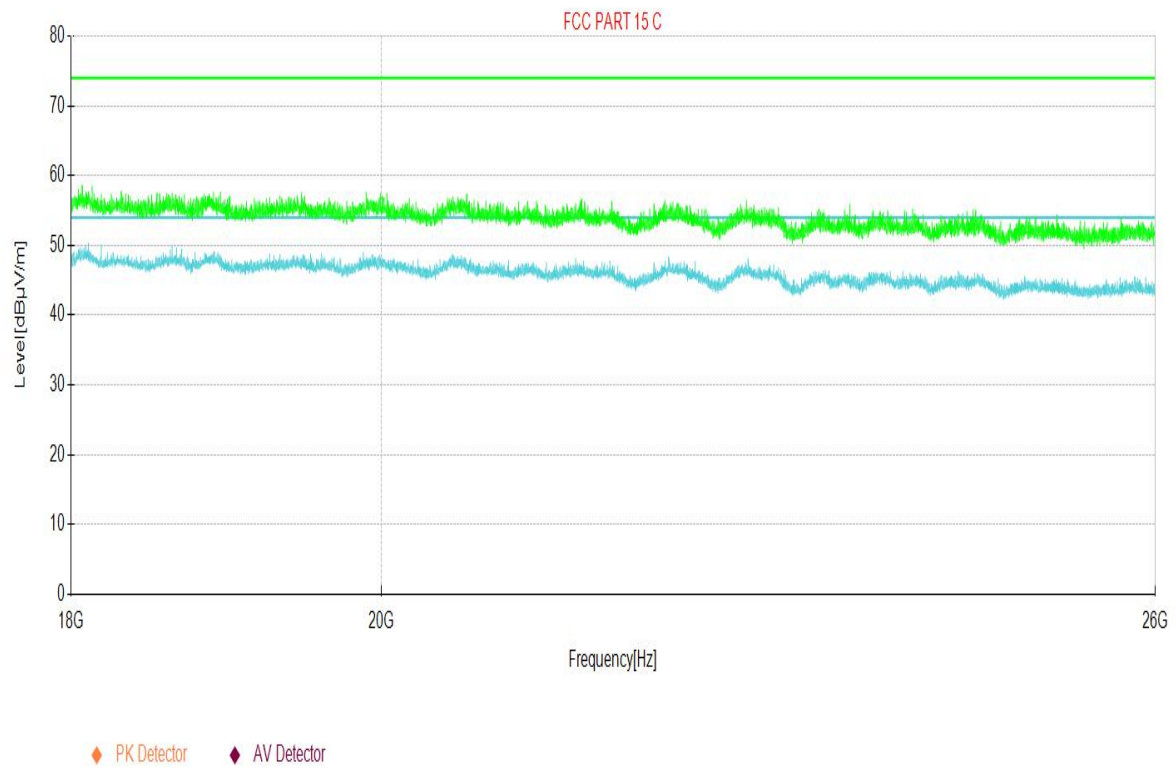
◆ PK Detector ◆ AV Detector

Suspected Data List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	3198.34	49.24	12.47	74.00	24.76	155	347	Horizontal
2	3198.34	40.93	12.47	54.00	13.07	150	347	Horizontal
3	4797.35	51.67	14.05	74.00	22.33	170	140	Horizontal
4	4814.52	43.80	14.05	54.00	10.20	150	24	Horizontal
5	7318.00	55.80	7.82	74.00	18.20	175	83	Horizontal
6	7319.17	51.62	7.83	54.00	2.38	150	83	Horizontal

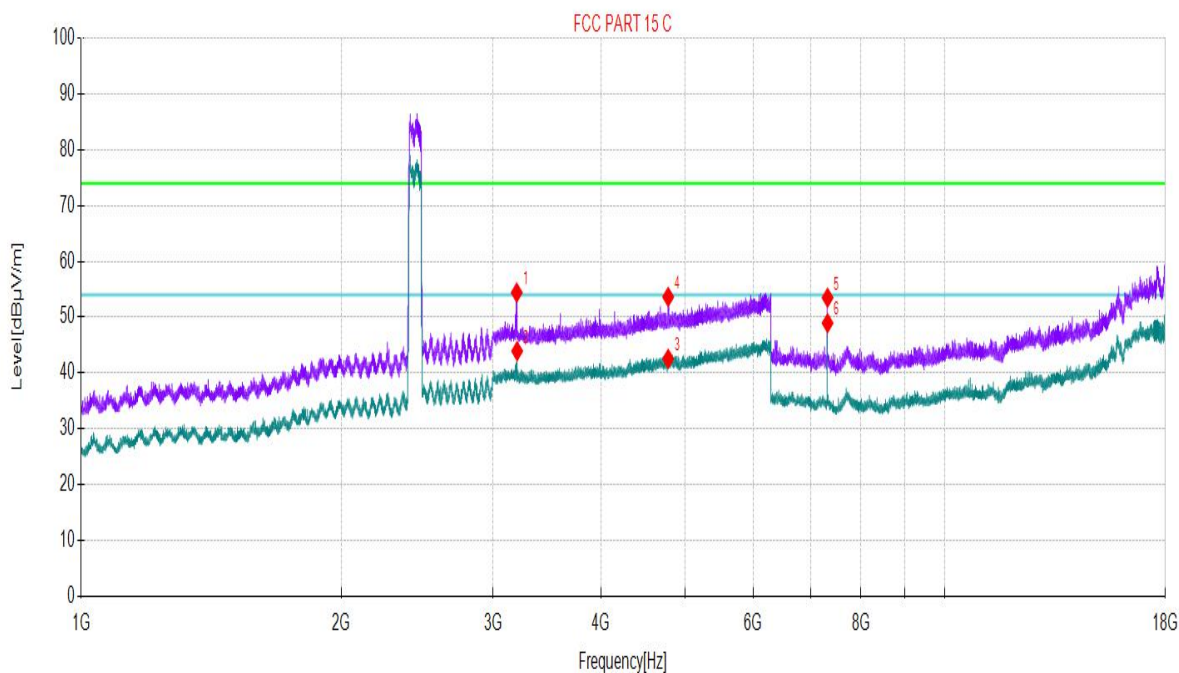
Mode:	BT-LE-CH19-Base
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Test Graph



Mode:	BT-LE-CH19 -Base
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Test Graph



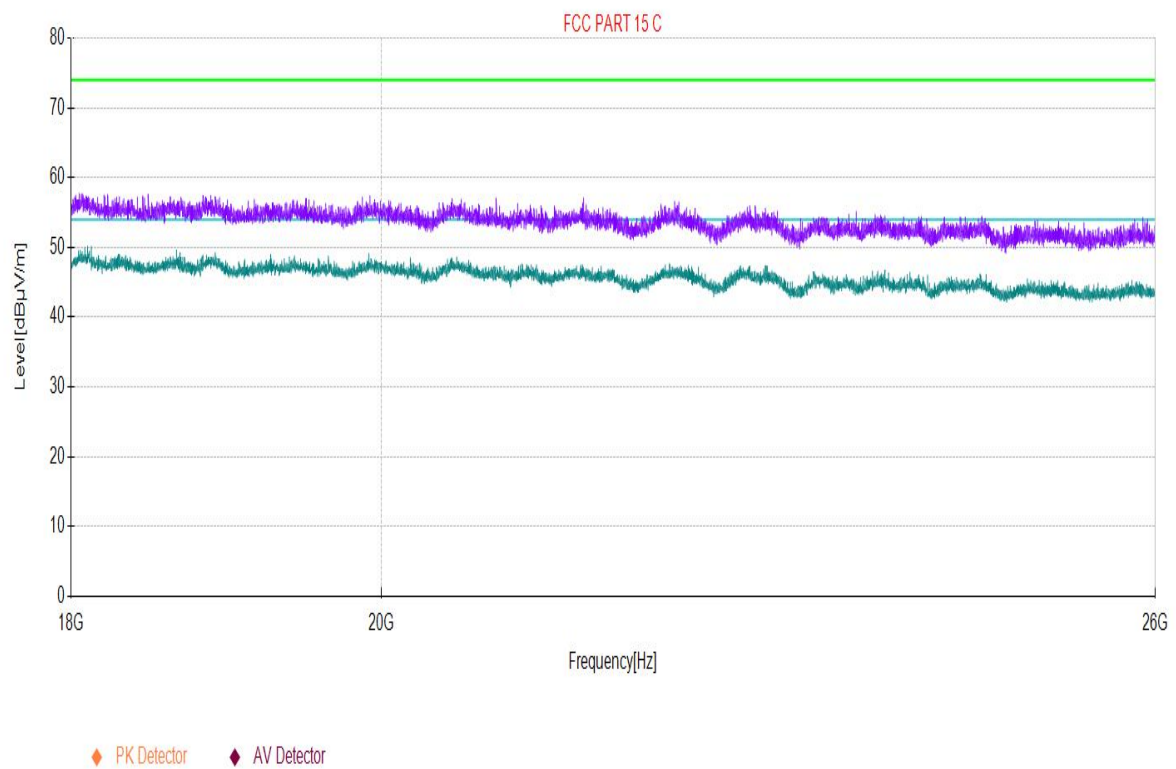
◆ PK Detector ◆ AV Detector

Suspected Data List

NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	3194.71	54.41	12.35	74.00	19.59	150	215	Vertical
2	3198.34	43.93	12.47	54.00	10.07	150	219	Vertical
3	4784.81	42.54	14.07	54.00	11.46	160	135	Vertical
4	4784.81	53.64	14.07	74.00	20.36	150	135	Vertical
5	7319.17	53.49	7.83	74.00	20.51	175	359	Vertical
6	7319.17	48.94	7.83	54.00	5.06	150	135	Vertical

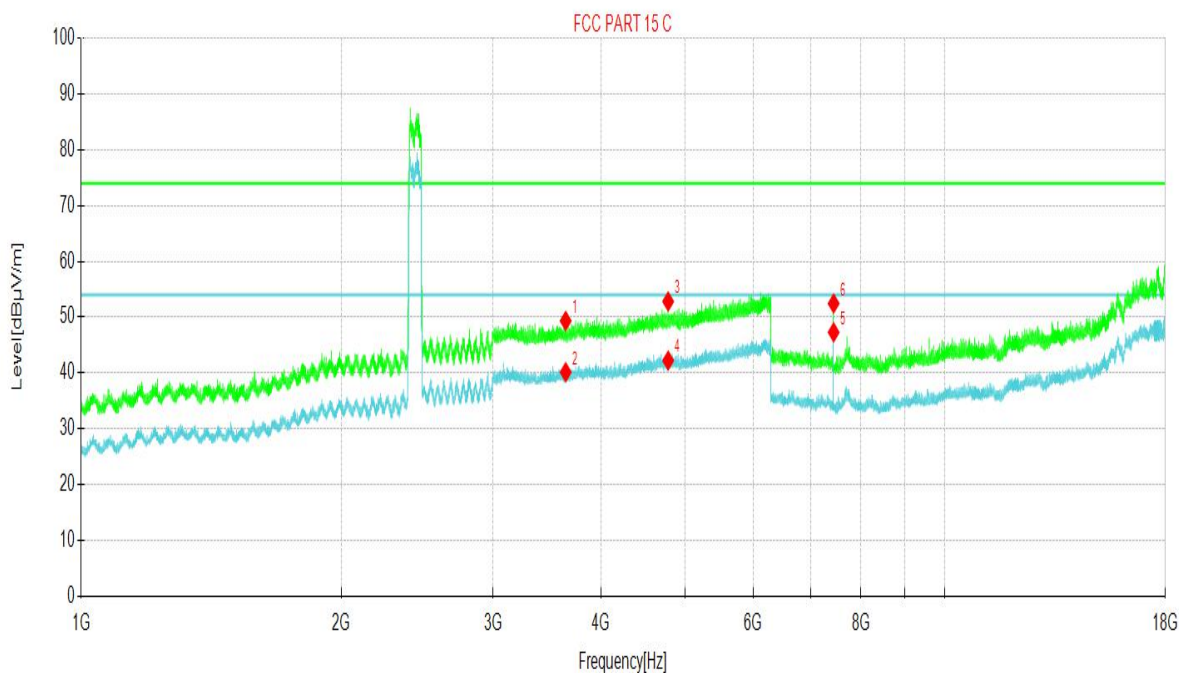
Mode:	BT-LE-CH19-Base
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Test Graph



Mode:	BT-LE-CH39 -Base
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Test Graph



◆ PK Detector ◆ AV Detector

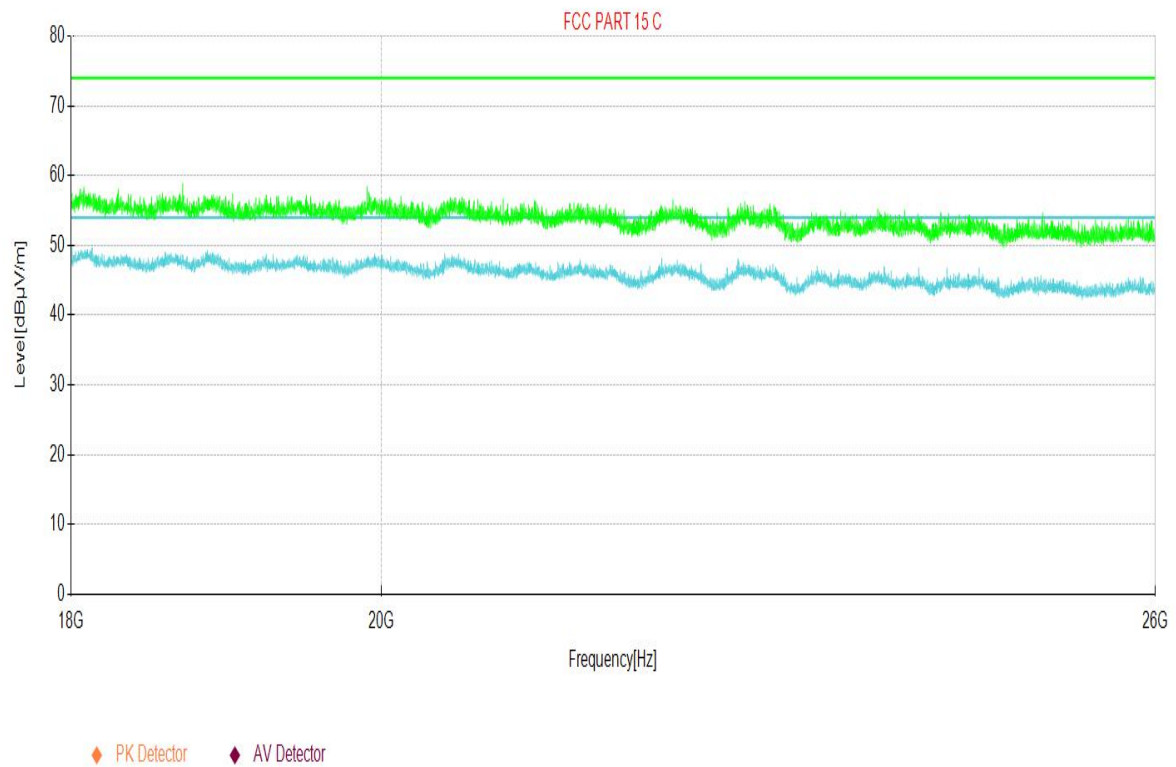
Suspected Data List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	3640.26	49.34	12.85	74.00	24.66	155	249	Horizontal
2	3640.26	40.15	12.85	54.00	13.85	150	30	Horizontal
3	4784.48	52.82	14.07	74.00	21.18	175	291	Horizontal
4	4784.48	42.23	14.07	54.00	11.77	155	291	Horizontal
5	7438.52	47.29	7.12	54.00	6.71	150	82	Horizontal
6	7438.52	52.45	7.12	74.00	21.55	160	90	Horizontal

Mode:

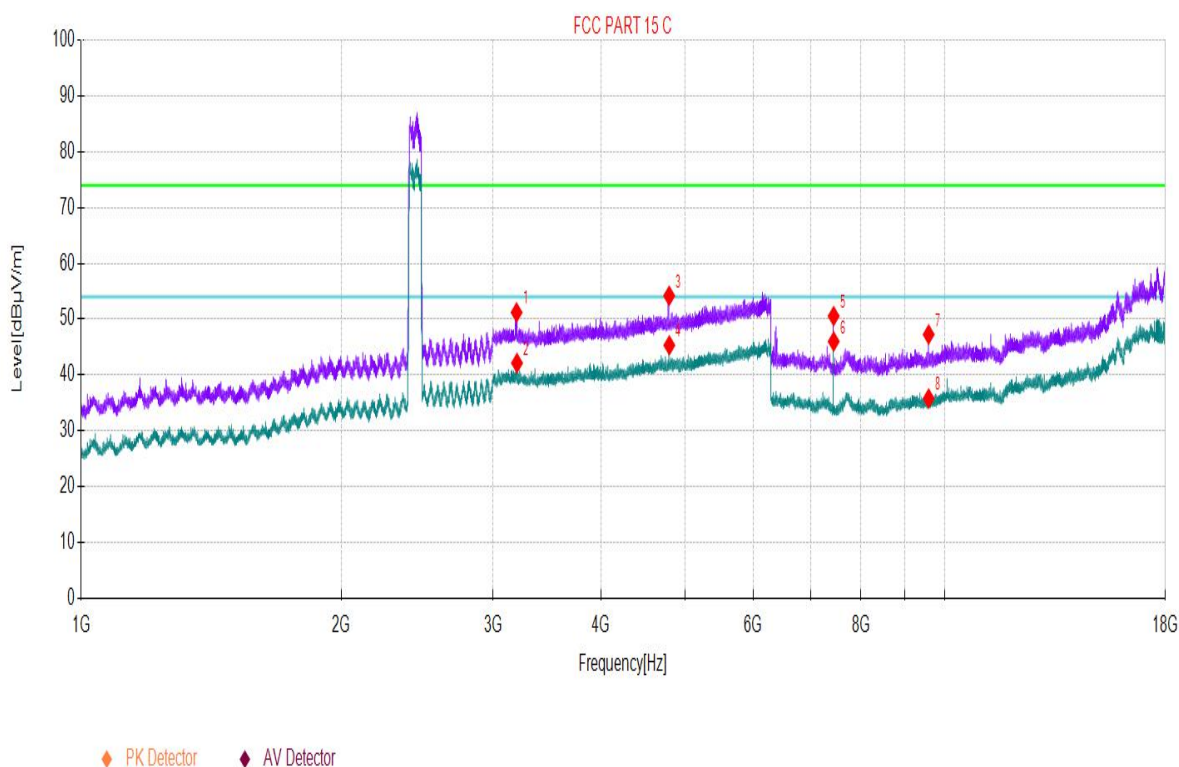
BT-LE-CH39-Base

Test Graph



Mode:	BT-LE-CH39 -Base
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Test Graph



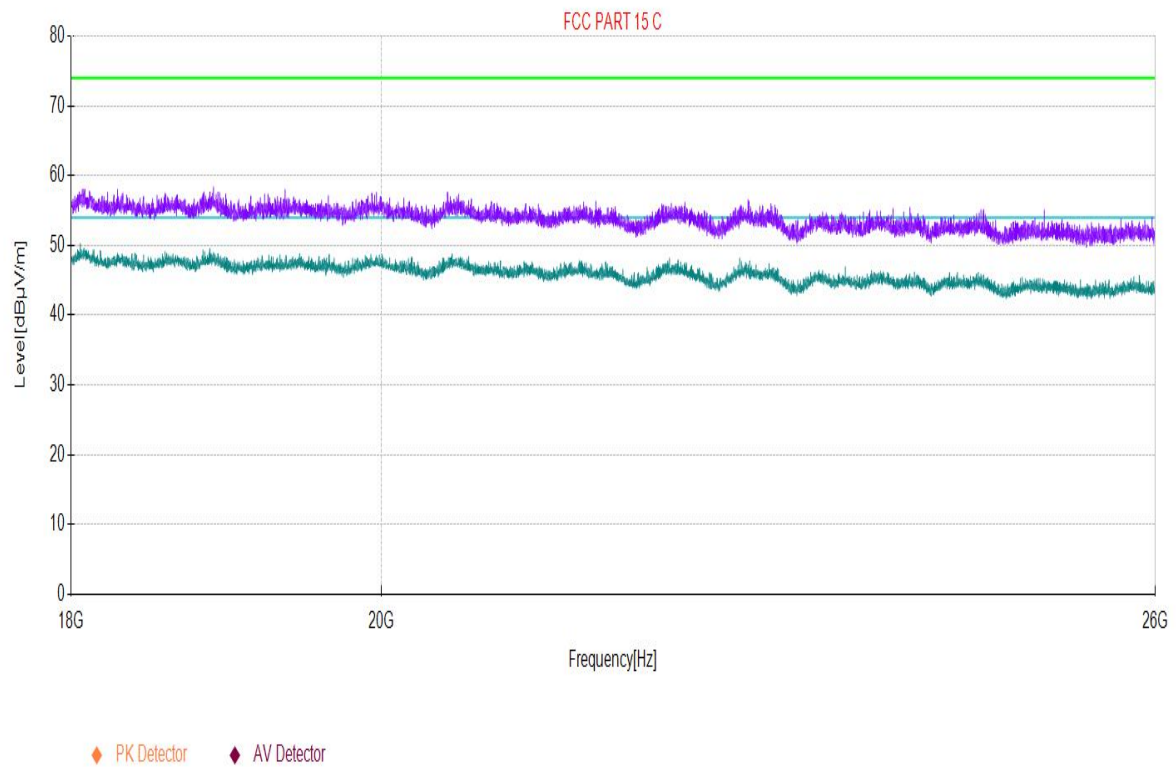
Suspected Data List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	3193.72	51.22	12.32	74.00	22.78	150	221	Vertical
2	3197.02	42.14	12.43	54.00	11.86	155	212	Vertical
3	4797.68	54.20	14.05	74.00	19.80	150	132	Vertical
4	4799.33	45.32	14.05	54.00	8.68	160	145	Vertical
5	7438.52	50.56	7.12	74.00	23.44	170	207	Vertical
6	7439.69	46.01	7.12	54.00	7.99	150	359	Vertical
7	9583.34	47.26	8.62	74.00	26.74	150	241	Vertical
8	9583.34	35.78	8.62	54.00	18.22	155	312	Vertical

Mode:

BT-LE-CH39-Base

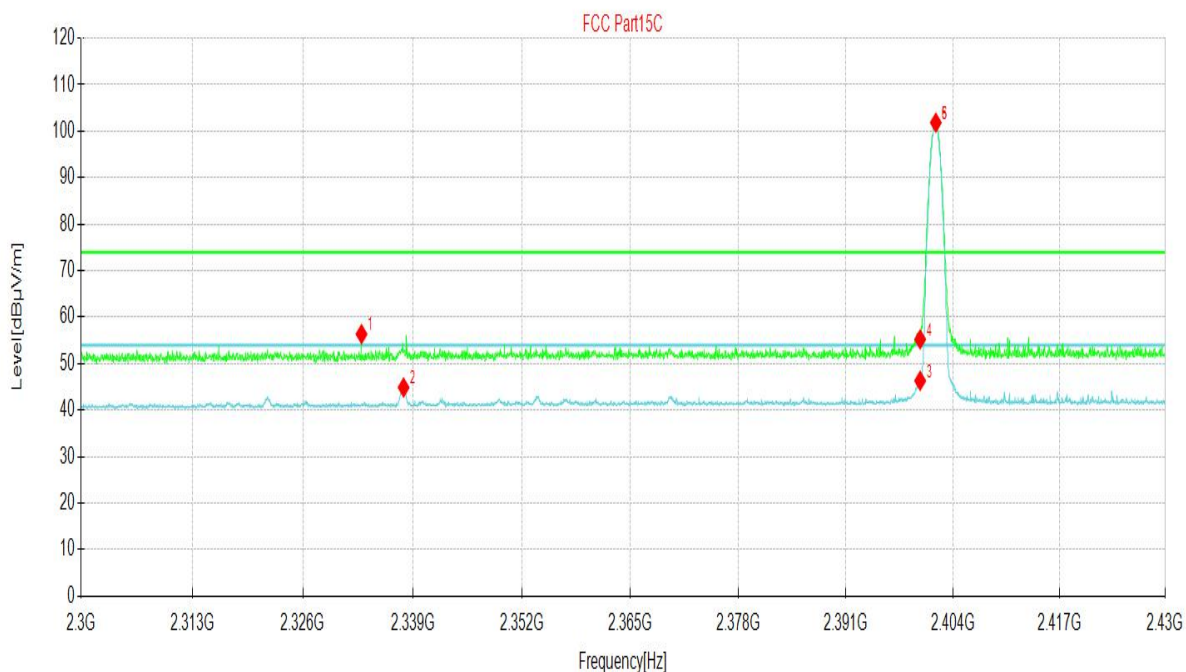
Test Graph



Bandedge:

Mode:	BT-LE-CH0-Base
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Test Graph



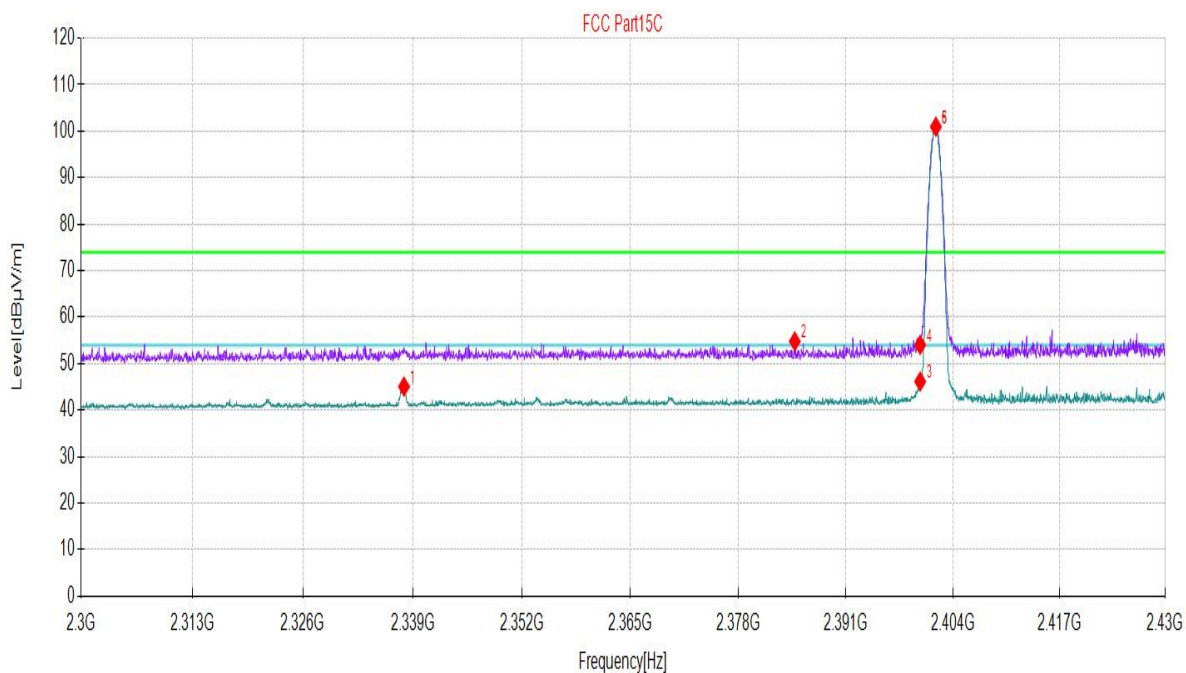
◆ PK Detector ◆ AV Detector

Suspected Data List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2332.94	56.37	11.63	74.00	17.63	160	115	Horizontal
2	2337.92	44.89	11.67	54.00	9.11	160	359	Horizontal
3	2400.00	46.32	11.89	54.00	7.68	150	72	Horizontal
4	2400.00	55.23	11.89	74.00	18.77	150	65	Horizontal
5	2401.91	101.85	11.92			150	79	Horizontal
6	2401.91	101.83	11.92			150	79	Horizontal

Mode:	BT-LE-CH0-Base
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Test Graph



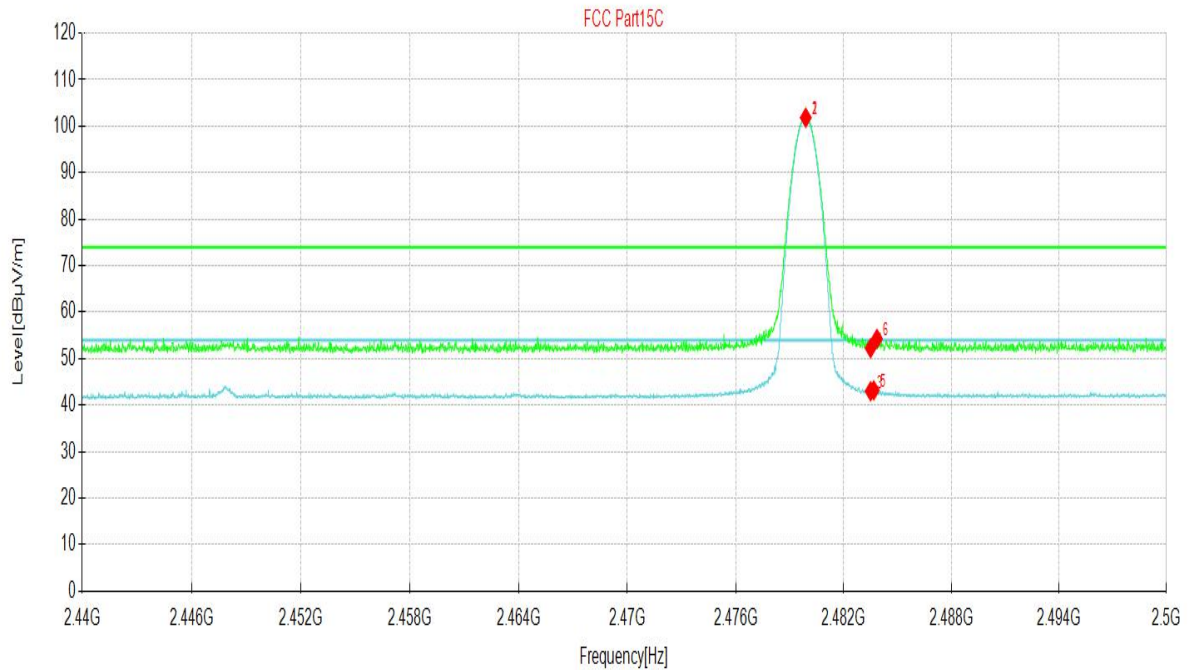
◆ PK Detector ◆ AV Detector

Suspected Data List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2337.97	45.07	11.68	54.00	8.93	160	125	Vertical
2	2384.78	54.81	11.86	74.00	19.19	160	133	Vertical
3	2400.00	46.17	11.89	54.00	7.83	150	136	Vertical
4	2400.00	54.05	11.89	74.00	19.95	150	136	Vertical
5	2401.91	100.97	11.92			150	136	Vertical
6	2401.91	100.94	11.92			150	136	Vertical

Mode:	BT-LE-CH39-Base
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Test Graph



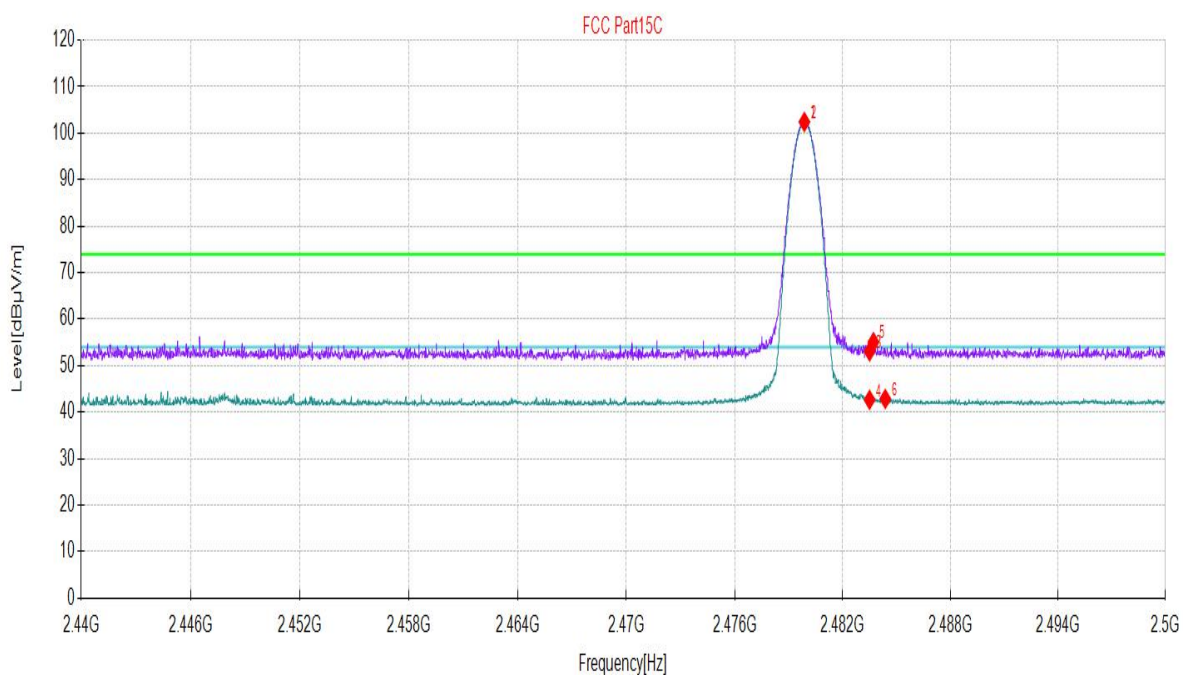
◆ AV Detector

Suspected Data List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2479.89	101.84	12.55			150	79	Horizontal
2	2479.91	101.86	12.55			150	79	Horizontal
3	2483.50	42.99	12.55	54.00	11.01	150	43	Horizontal
4	2483.50	52.25	12.55	74.00	21.75	150	228	Horizontal
5	2483.67	43.20	12.55	54.00	10.80	170	79	Horizontal
6	2483.85	54.30	12.55	74.00	19.70	170	214	Horizontal

Mode:	BT-LE-CH39-Base
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Test Graph



◆ AV Detector

Suspected Data List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2479.87	102.44	12.55			150	140	Vertical
2	2479.89	102.42	12.55			150	140	Vertical
3	2483.50	53.07	12.55	74.00	20.93	150	162	Vertical
4	2483.50	42.67	12.55	54.00	11.33	150	115	Vertical
5	2483.71	55.10	12.55	74.00	18.90	170	140	Vertical
6	2484.37	42.84	12.55	54.00	11.16	170	140	Vertical



5.2 DTS Bandwidth

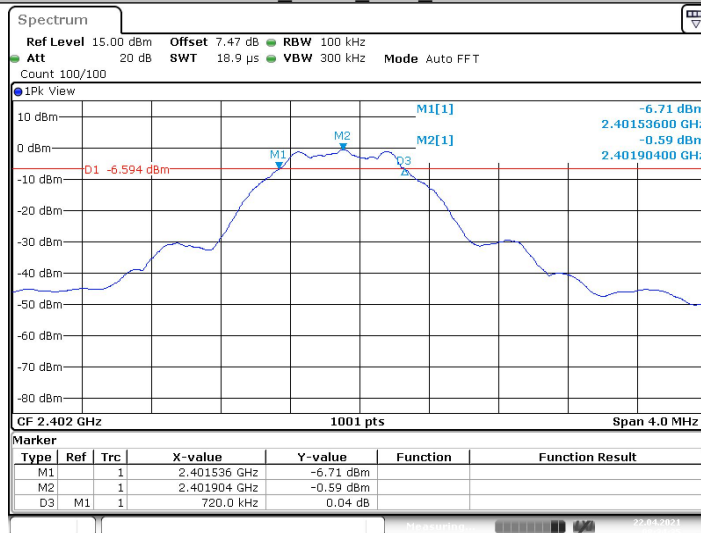
5.2.1 Test Result

TestMode	Antenna	Channel	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_BT4.0	Ant1	2402	0.720	2401.536	2402.256	0.5	PASS
		2440	0.724	2439.532	2440.256	0.5	PASS
		2480	0.720	2479.540	2480.260	0.5	PASS

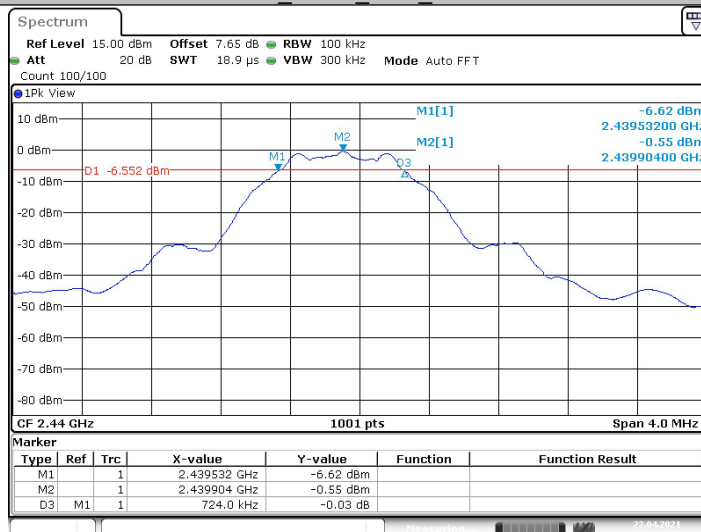


Test Graphs

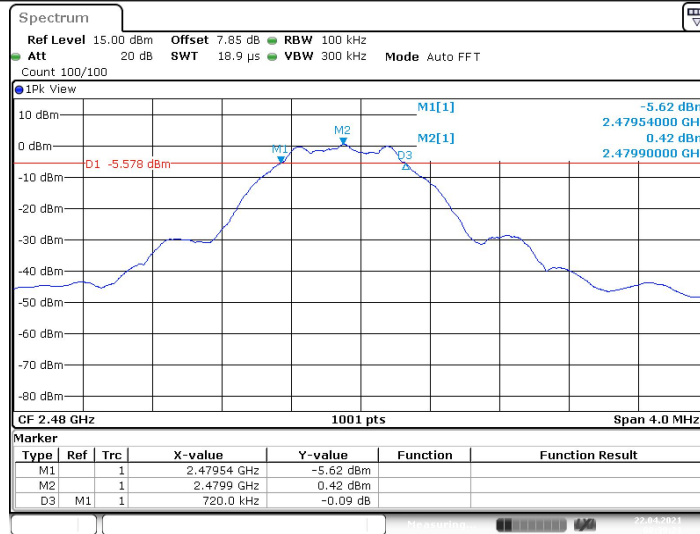
BLE_BT4.0_Ant1_2402



BLE_BT4.0_Ant1_2440



BLE_BT4.0_Ant1_2480



Date: 22.APR.2021 08:39:23



5.3 Occupied Channel Bandwidth

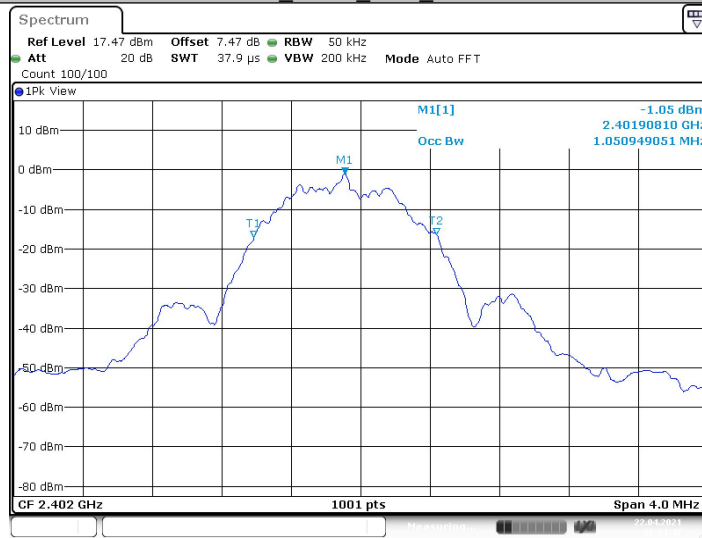
5.3.1 Test Result

TestMode	Antenna	Channel	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_BT4.0	Ant1	2402	1.051	2401.385	2402.436	---	PASS
		2440	1.047	2439.385	2440.432	---	PASS
		2480	1.051	2479.381	2480.432	---	PASS



Test Graphs

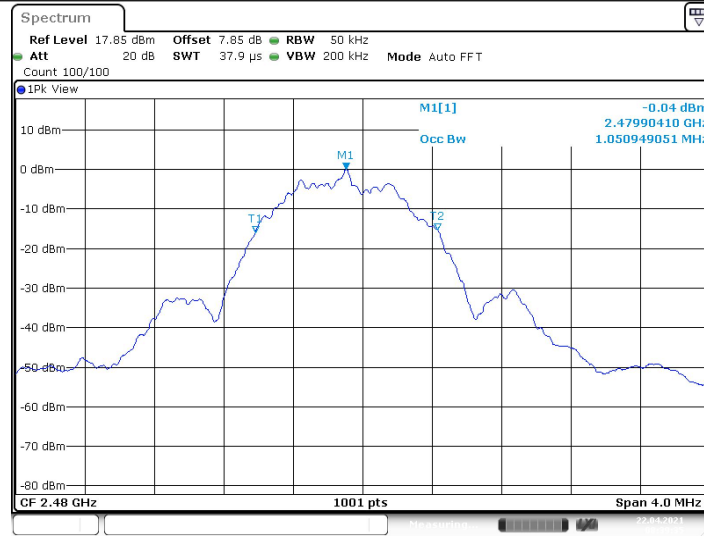
BLE_BT4.0_Ant1_2402



BLE_BT4.0_Ant1_2440



BLE_BT4.0_Ant1_2480



Date: 22.APR.2021 08:39:36



5.4 Maximum conducted output power

5.4.1 Test Result

AVG:

TestMode	Antenna	Channel	Result[dBm]	Limit[dBm]	Verdict
BLE_BT4.0	Ant1	2402	-1.35	<=30	PASS
		2440	-1.48	<=30	PASS
		2480	-0.65	<=30	PASS

PK:

TestMode	Antenna	Channel	Result[dBm]	Limit[dBm]	Verdict
BLE_BT4.0	Ant1	2402	1.85	<=30	PASS
		2440	1.83	<=30	PASS
		2480	2.55	<=30	PASS



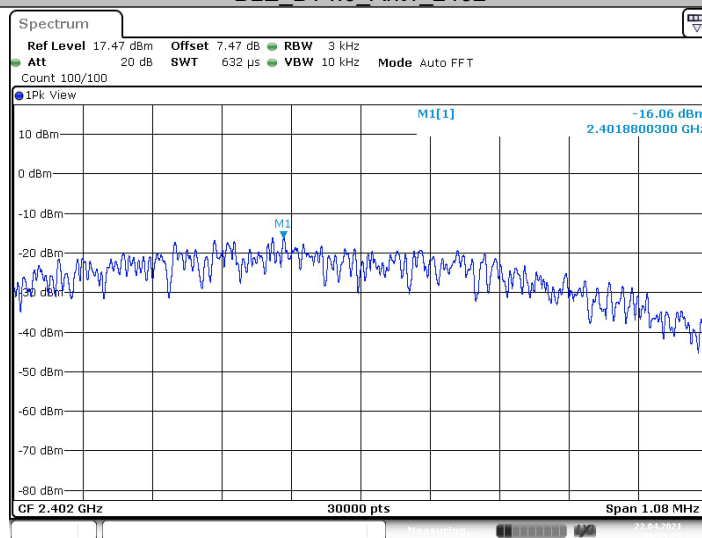
5.5 Maximum power spectral density

5.5.1 Test Result

TestMode	Antenna	Channel	Result[dBm/3-100kHz]	Limit[dBm/3kHz]	Verdict
BLE_BT4.0	Ant1	2402	-16.06	<=8	PASS
		2440	-15.93	<=8	PASS
		2480	-15.06	<=8	PASS

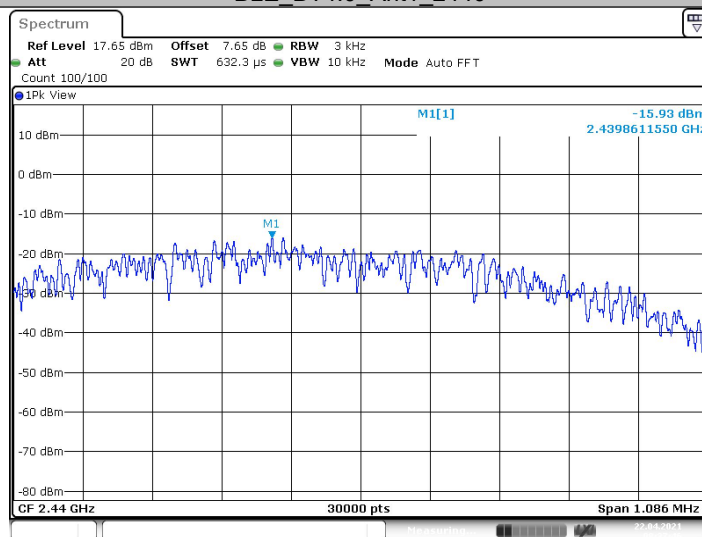
Test Graphs

BLE_BT4.0_Ant1_2402



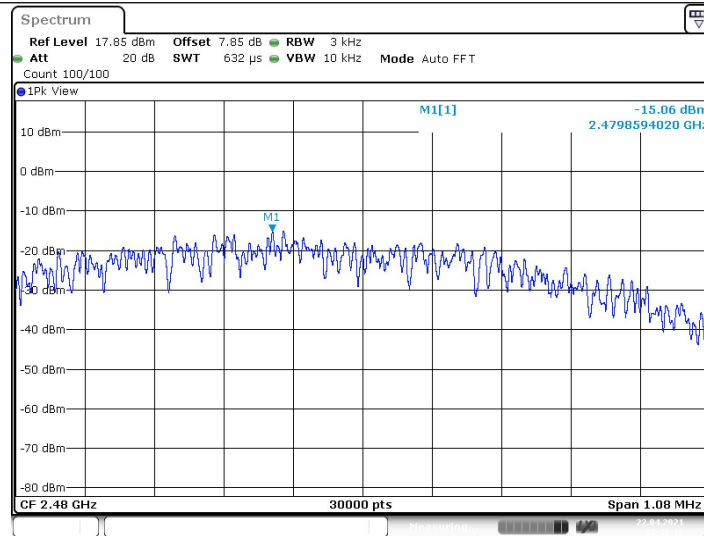
Date: 22.APR.2021 08:35:29

BLE_BT4.0_Ant1_2440



Date: 22.APR.2021 08:37:47

BLE_BT4.0_Ant1_2480



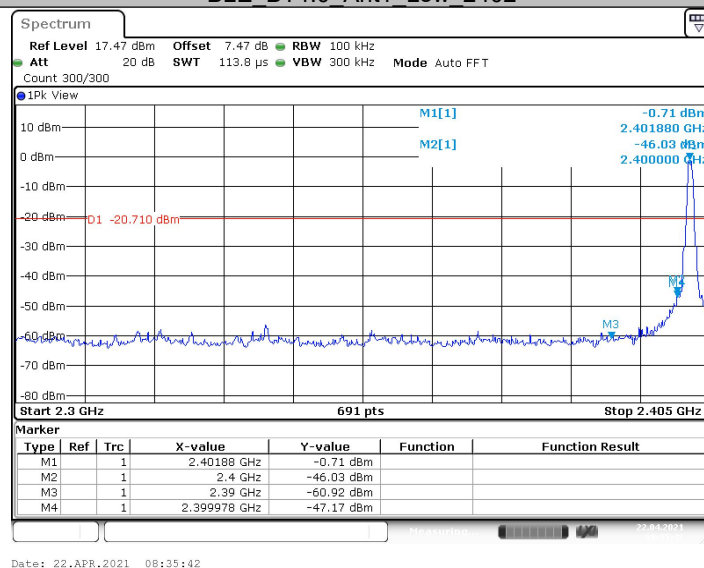
5.6 Band edge measurements

5.6.1 Test Result

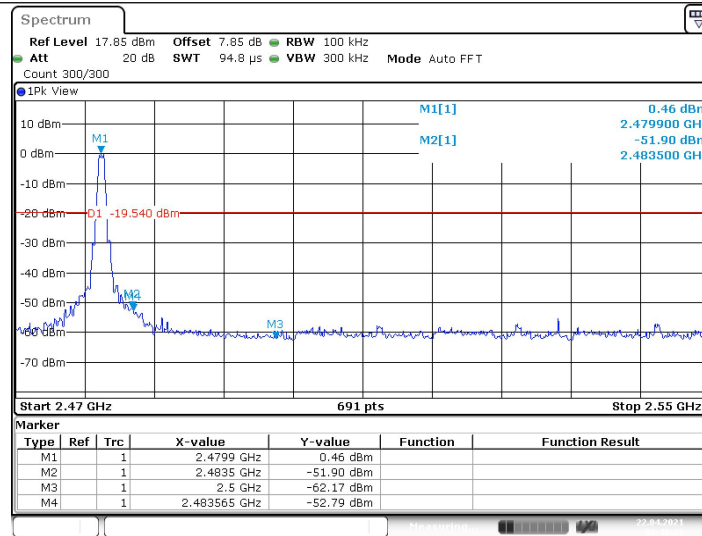
TestMode	Antenna	ChName	Channel	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_BT4.0	Ant1	Low	2402	-0.71	-47.17	<=-20.71	PASS
		High	2480	0.46	-52.79	<=-19.54	PASS

Test Graphs

BLE_BT4.0_Ant1_Low_2402



BLE_BT4.0_Ant1_High_2480

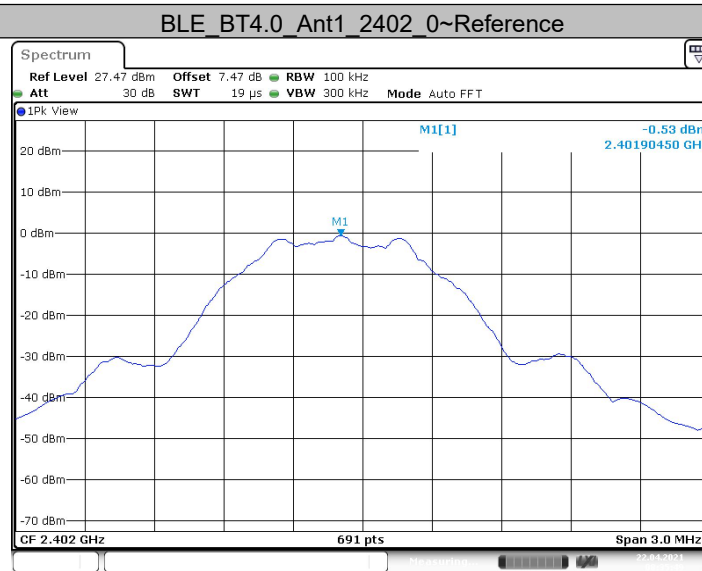


5.7 Conducted Spurious Emission

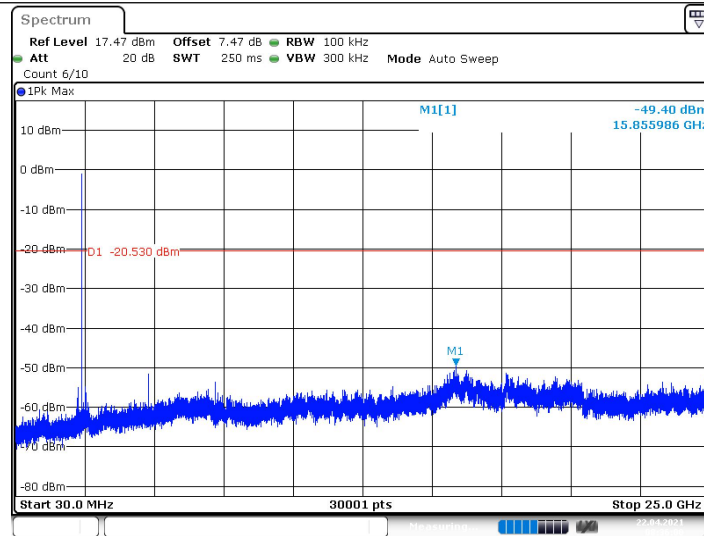
5.7.1 Test Result

TestMode	Antenna	Channel	FreqRange [MHz]	RefLevel [dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_BT4.0	Ant1	2402	Reference	-0.53	-0.53	---	PASS
			30~25000	-0.53	-49.4	<=-20.53	PASS
		2440	Reference	-0.53	-0.53	---	PASS
			30~25000	-0.53	-50.48	<=-20.53	PASS
		2480	Reference	0.39	0.39	---	PASS
			30~25000	0.39	-49.9	<=-19.61	PASS

Test Graphs

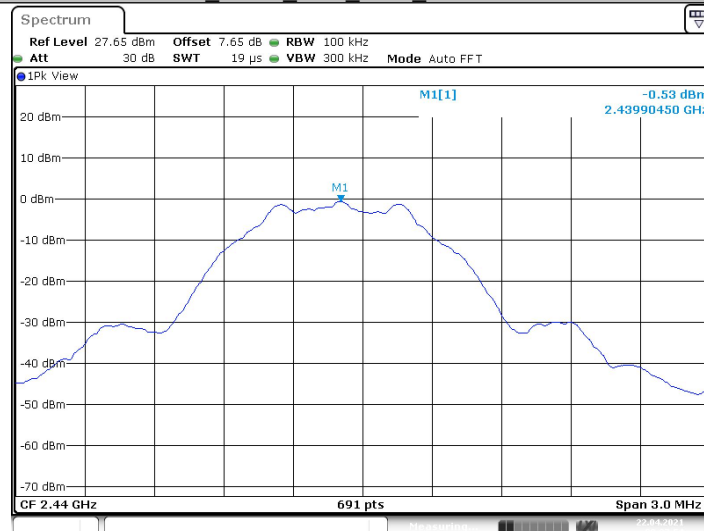


BLE_BT4.0_Ant1_2402_30~25000



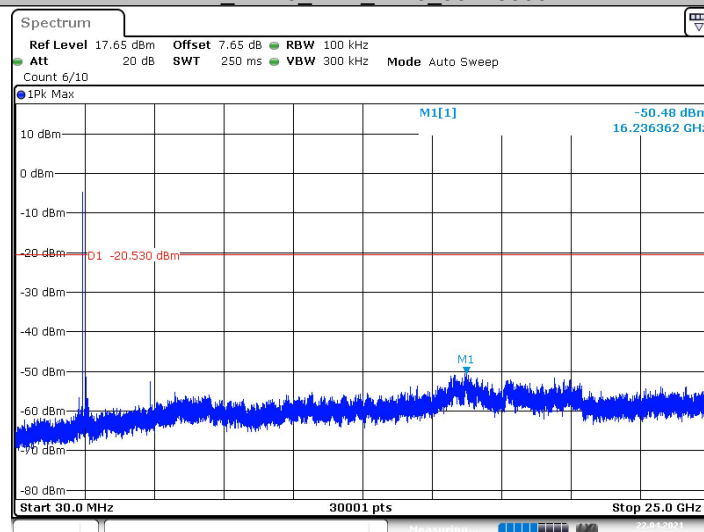
Date: 22.APR.2021 08:36:00

BLE_BT4.0_Ant1_2440_0~Reference



Date: 22.APR.2021 08:37:54

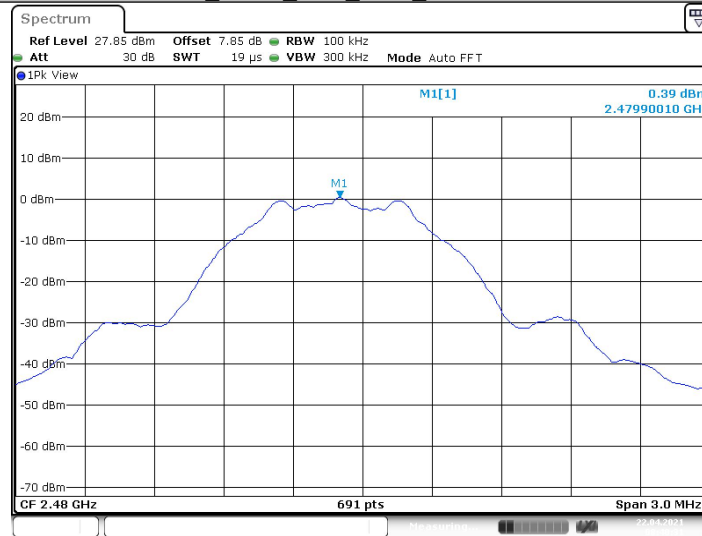
BLE_BT4.0_Ant1_2440_30~25000



Date: 22.APR.2021 08:38:05

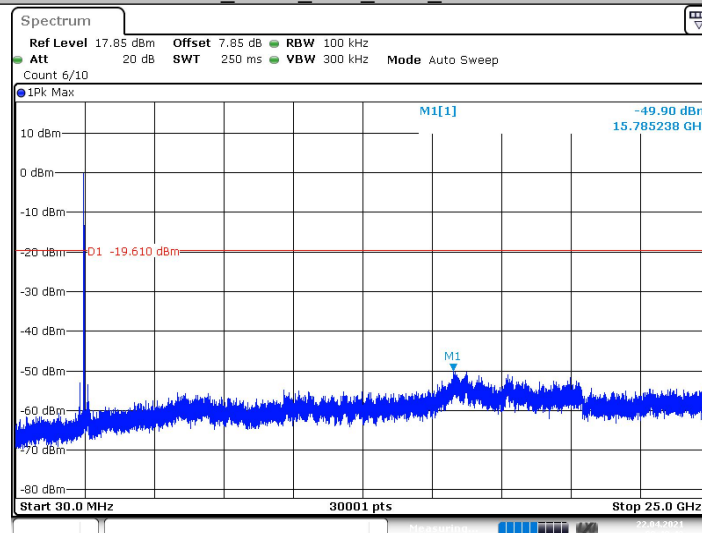


BLE_BT4.0_Ant1_2480_0~Reference



Date: 22.APR.2021 08:40:31

BLE_BT4.0_Ant1_2480_30~25000



Date: 22.APR.2021 08:40:42

Appendix B

Conducted Emission Test					
Equipment	Manufacturer	Model No.	Serial Number	Cal. Due	Used
EMI Test Receiver	Rohde&Schwarz	ESR3	102694	2021-05-19	☒
LISN	Rohde&Schwarz	ENV216	102569	2021-05-21	☒
LISN	SCHWARZBECK	NSLK 8129	5021	2021-05-21	☐
ISN	Rohde&Schwarz	ENV 81	100401	2021-05-19	☐
ISN	Rohde&Schwarz	ENV 81 Cat6	101896	2021-05-19	☐
Plus Limiter	Rohde&Schwarz	ESH3-Z2	102824	2021-05-19	☒
Plus Limiter	AEROFLEX	37-10-34	CF3049	2021-11-08	☐
Impedance Stabilization Network	Rohde&Schwarz	MATCHING	/	2021-12-11	☐
Digital signal generator	TELEVIEW	DTV800	/	2021-05-19	☐
AudioSignalGenerator	GW	GAG-810	EK871591	2021-12-11	☐
Shielding Room(#1)	MORI	854	/	2023-05-19	☒

Radiated Emission Test - 3M Chamber					
Equipment	Manufacturer	Model No.	Serial Number	Cal. Due	Used
EMI Test Receiver	Rohde&Schwarz	ESR 26	101718	2021.5.19	☒
Loop antenna	Rohde&Schwarz	HFH2-Z2E	100951	2021.5.16	☒
Rod antenna	Rohde&Schwarz	HFH2-Z6E	101268	2021.5.24	☒
Double cone antenna	Rohde&Schwarz	HK116E	10359	2021.5.24	☒
Log periodic antenna	Rohde&Schwarz	HL223	100936	2021.5.24	☒
antenna(30MHz~1000MHz)	SCHWARZBECK	VULB 9168	1132	2021.5.16	☒
Horn antenna(1GHz-6GHz)	SCHWARZBECK	BBHA 9120E	947	2023.5.19	☒
Horn antenna(1GHz-18GHz)	ETS	3117	227634	2022.1.14	☒
Horn antenna(18GHz-40GHz)	SCHWARZBECK	BBHA 9170	1003	2021.5.16	☒
3m anechoic chamber	MORI	966	N/A	2023.5.19	☒
LISN (single-phase)	Rohde&Schwarz	ESH3-Z6	102152/102156	2021.5.21	☒
Preamplifier	Rohde&Schwarz	SCU-01F	100298	2021.5.19	☒
Preamplifier	Rohde&Schwarz	SCU-18F	100799	2021.5.19	☒

Antenna Port Conducted Test					
Equipment	Manufacturer	Model No.	Serial Number	Cal. Due	Used
Signal&Spectrum Analyzer	Rohde&Schwarz	FSV 40	101898	2021.5.19	☒
Wideband radio communication tester	Rohde&Schwarz	CMW 500	168778	2021.5.19	☐
Automatic control unit(RSE)	Rohde&Schwarz	OSP220	101742	2021.5.19	☐
Filter group(RSE-BT/WiFi)	Rohde&Schwarz	WiFi /BT Variant 1	100820	2021.5.19	☒
Filter group(RSE-Cellular)	Rohde&Schwarz	Cellular Variant 1	100768	2021.5.19	☒
Signal&Spectrum Analyzer	Rohde&Schwarz	FSVA 3044	101013	2021.5.19	☒
signal Generator(100kHz~40GHz)	Rohde&Schwarz	SMB 100A	CS0300015	2021.05.19	☐
signal Generator(100kHz~12.75GHz)	Rohde&Schwarz	SMB 100A	CS0300016	2021.5.19	☐

Important

- (1) The test report is valid with the official seal of the laboratory and the signatures of Test engineer, Author and Reviewer simultaneously.
- (2) The test report is invalid if altered.
- (3) Any photocopies or part photocopies in the test report are forbidden without the written permission from the laboratory.
- (4) Objections to the test report must be submitted to the laboratory within 15 days.
- (5) Generally, commission test is responsible for the tested samples only.

Address of the laboratory:

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