

FCC Test Report

Product Name : Analog GPS Speedometer
Trade Name : Omata
Model No. : one
FCC ID. : 2AOIMOMATA1

Applicant : Haltian Products Oy
Address : Yrttipellontie 1D, 90230 Oulu, Finland

Date of Receipt : Nov. 15, 2017
Issued Date : Feb. 12, 2018
Report No. : 17B0248R-RFUSP02V00
Report Version : V2.0



The test results relate only to the samples tested.

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Test Report Certification

Issued Date : Feb. 12, 2018

Report No. : 17B0248R-RFUSP02V00



Product Name : Analog GPS Speedometer
Applicant : Haltian Products Oy
Address : Yrttipellontie 1D, 90230 Oulu, Finland
Manufacturer : Haltian Products Oy
Model No. : one
FCC ID. : 2AOIMOMATA1
EUT Voltage : DC 3.7V(power by battery)
DC 5V(power by PC)
Testing Voltage : DC 3.7V(power by battery)
DC 5V(power by PC)
Trade Name : Omata
Applicable Standard : FCC CFR Title 47 Part 15 Subpart C Section 15.247: 2016
ANSI C63.10: 2013
Laboratory Name : Hsin Chu Laboratory
Address : No.372-2, Sec. 4, Zhongxing Rd., Zhudong Township,
Hsinchu County 310, Taiwan, R.O.C.
TEL: +886-3-582-8001 / FAX: +886-3-582-8958
Test Result : Complied

Documented By

:



(Demi Chang / Senior Engineering Adm. Specialist)

Tested By

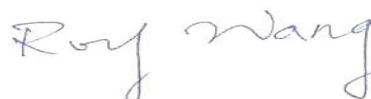
:



(Clemens Fang / Engineer)

Approved By

:



(Roy Wang / Director)

Revision History

Report No.	Version	Description	Issued Date
17B0248R-RFUSP02V00	V2.0	Initial issue of report	Feb. 12, 2018

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1. General Information

1.1. EUT Description

Product Name	Analog GPS Speedometer
Trade Name	Omata
Model No.	one
Frequency Range/ Channel Number	2402~2480MHz / 78 Channels
Type of Modulation	GFSK

Antenna Information	
Antenna Type	PIFA Antenna
Antenna Gain	0.8dBi

Accessories Information	
USB Cable	Shielded, 0.23m

Working Frequency of Each Channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
Channel 00	2402 MHz	Channel 20	2422 MHz	Channel 40	2442 MHz	Channel 60	2462 MHz
Channel 01	2403 MHz	Channel 21	2423 MHz	Channel 41	2443 MHz	Channel 61	2463 MHz
Channel 02	2404 MHz	Channel 22	2424 MHz	Channel 42	2444 MHz	Channel 62	2464 MHz
Channel 03	2405 MHz	Channel 23	2425 MHz	Channel 43	2445 MHz	Channel 63	2465 MHz
Channel 04	2406 MHz	Channel 24	2426 MHz	Channel 44	2446 MHz	Channel 64	2466 MHz
Channel 05	2407 MHz	Channel 25	2427 MHz	Channel 45	2447 MHz	Channel 65	2467 MHz
Channel 06	2408 MHz	Channel 26	2428 MHz	Channel 46	2448 MHz	Channel 66	2468 MHz
Channel 07	2409 MHz	Channel 27	2429 MHz	Channel 47	2449 MHz	Channel 67	2469 MHz
Channel 08	2410 MHz	Channel 28	2430 MHz	Channel 48	2450 MHz	Channel 68	2470 MHz
Channel 09	2411 MHz	Channel 29	2431 MHz	Channel 49	2451 MHz	Channel 69	2471 MHz
Channel 10	2412 MHz	Channel 30	2432 MHz	Channel 50	2452 MHz	Channel 70	2472 MHz
Channel 11	2413 MHz	Channel 31	2433 MHz	Channel 51	2453 MHz	Channel 71	2473 MHz
Channel 12	2414 MHz	Channel 32	2434 MHz	Channel 52	2454 MHz	Channel 72	2474 MHz
Channel 13	2415 MHz	Channel 33	2435 MHz	Channel 53	2455 MHz	Channel 73	2475 MHz
Channel 14	2416 MHz	Channel 34	2436 MHz	Channel 54	2456 MHz	Channel 74	2476 MHz
Channel 15	2417 MHz	Channel 35	2437 MHz	Channel 55	2457 MHz	Channel 75	2477 MHz
Channel 16	2418 MHz	Channel 36	2438 MHz	Channel 56	2458 MHz	Channel 76	2478 MHz
Channel 17	2419 MHz	Channel 37	2439 MHz	Channel 57	2459 MHz	Channel 77	2479 MHz
Channel 18	2420 MHz	Channel 38	2440 MHz	Channel 58	2460 MHz	Channel 78	2480 MHz
Channel 19	2421 MHz	Channel 39	2441 MHz	Channel 59	2461 MHz		

Note:

1. This device is Analog GPS Speedometer supports BT4.0 and ANT+ transmitting and BT4.0, ANT+ and GPS receiving function.
2. Regards to the frequency band operation; the lowest , middle and highest frequency of channel were selected to perform the test, and then shown on this report.

1.2. Test Mode

DEKRA has verified the construction and function in typical operation. The preliminary tests were performed in different data rate, and to find the worst condition, which was shown in this test report. The following table is the final test mode.

TX	Mode 1: Transmitter_Power by PC Mode 2: Transmitter_Power by Battery
----	---

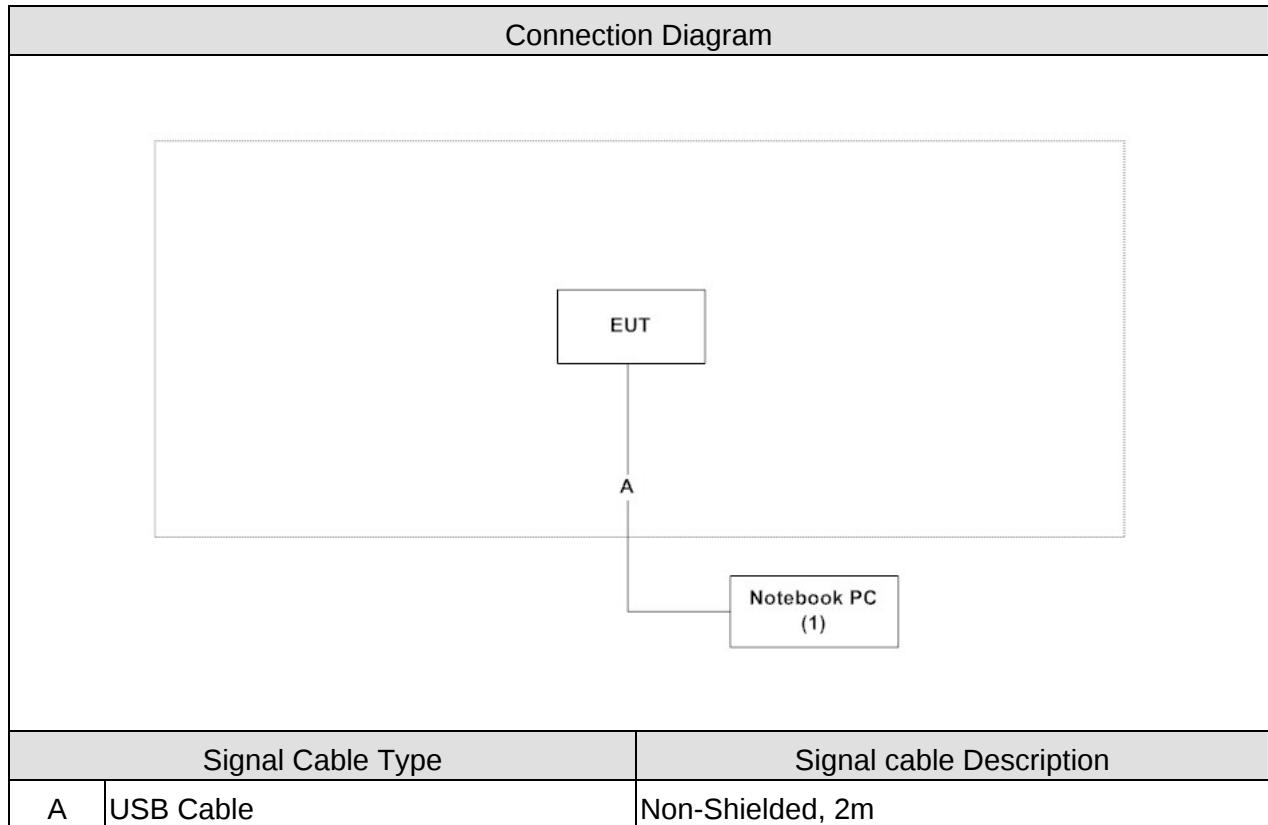
Test Items	Modulation	Channel	Antenna	Result
Conducted Emission	GFSK	39	0	N/A
Peak Power Output	GFSK	00/39/78	0	Complies
Radiated Emission	GFSK	00/39/78	0	Complies
RF antenna conducted test	GFSK	00/39/78	0	Complies
Radiated Emission Band Edge	GFSK	00/39/78	0	Complies
DTS Bandwidth	GFSK	00/39/78	0	Complies
Occupied Bandwidth	GFSK	00/39/78	0	Complies
Power Density	GFSK	00/39/78	0	Complies

1.3. Tested System Details

The types for all equipments, plus descriptions of all cables used in the tested system (including inserted cards) are:

Product	Manufacturer	Model No.	Serial No.	FCC ID	Power Cord
1 Notebook PC	HP	NX6320	CNU62D1F6F	DoC	Non-Shielded, 1.8m

1.4. Configuration of tested System



1.5. EUT Exercise Software

1	Setup the EUT as shown in Section 1.4.
2	Execute the test program "HEAT.exe".
3	Configure the test mode, the test channel, and the data rate.
4	Press "Start TX" to start the continuous transmitting.
5	Verify that the EUT works properly.

1.6. Test Facility

Ambient conditions in the laboratory:

Items	Test Item	Required (IEC 68-1)	Actual	Test Site
Temperature (°C)	FCC PART 15 C 15.207 Conducted Emission	15 - 35	20°C	--
Humidity (%RH)		25 - 75	50%RH	
Barometric pressure (mbar)		860 - 1060	950-1000	
Temperature (°C)	FCC PART 15 C 15.247 Peak Power Output	15 - 35	25°C	3
Humidity (%RH)		25 - 75	45%RH	
Barometric pressure (mbar)		860 - 1060	950-1000	
Temperature (°C)	FCC PART 15 C 15.247 Radiated Emission	15 - 35	25°C	2
Humidity (%RH)		25 - 75	65%RH	
Barometric pressure (mbar)		860 - 1060	950-1000	
Temperature (°C)	FCC PART 15 C 15.247 RF antenna conducted test	15 - 35	25°C	3
Humidity (%RH)		25 - 75	45%RH	
Barometric pressure (mbar)		860 - 1060	950-1000	
Temperature (°C)	FCC PART 15 C 15.247 Band Edge	15 - 35	25°C	2
Humidity (%RH)		25 - 75	48%RH	
Barometric pressure (mbar)		860 - 1060	950-1000	
Temperature (°C)	FCC PART 15 C 15.247 DTS Bandwidth	15 - 35	25°C	3
Humidity (%RH)		25 - 75	45%RH	
Barometric pressure (mbar)		860 - 1060	950-1000	
Temperature (°C)	FCC PART 15 C 15.247 Occupied Bandwidth	15 - 35	25°C	3
Humidity (%RH)		25 - 75	45%RH	
Barometric pressure (mbar)		860 - 1060	950-1000	
Temperature (°C)	FCC PART 15 C 15.247 Power Density	15 - 35	25°C	3
Humidity (%RH)		25 - 75	45%RH	
Barometric pressure (mbar)		860 - 1060	950-1000	

Note: Test site information refers to Laboratory Information.

The related certificate for our laboratories about the test site and management system can be downloaded from DEKRA Testing and Certification Co., Ltd. Web Site:

<http://www.dekra.com.tw/english/about/certificates.aspx?bval=5>

The address and introduction of DEKRA Testing and Certification Co., Ltd. laboratories can be founded in our Web Site : http://www.dekra.com.tw/index_en.aspx

If you have any comments, Please don't hesitate to contact us. Our test sites as below:

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TEL: +886-3-582-8001 / FAX: +886-3-582-8958 E-Mail : info.tw@dekra.com

2. Conducted Emission

2.1. Test Equipment

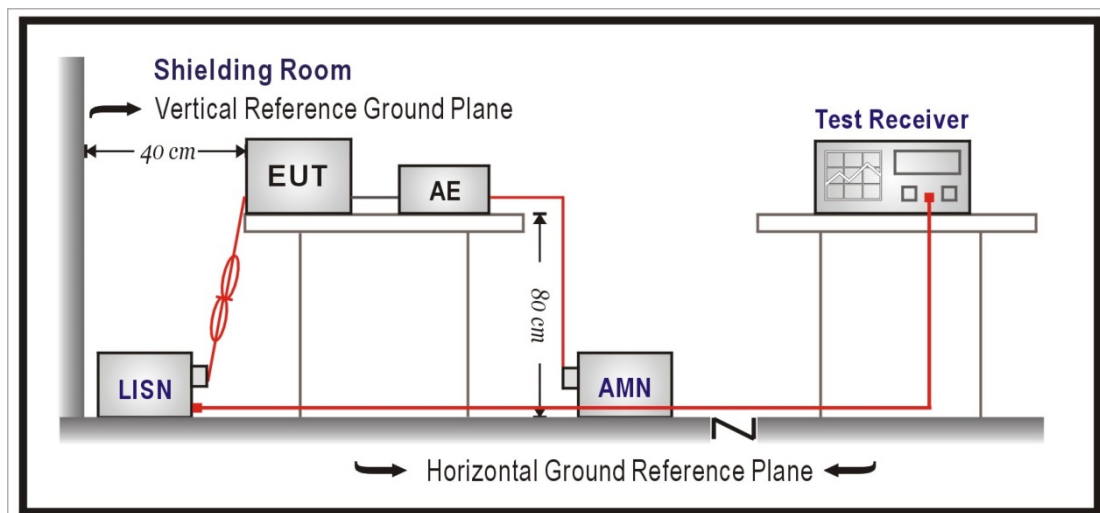
The following test equipments are used during the test:

Conducted Emission / SR2-H

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
Artificial Mains Network	R&S	ENV4200	848411/010	2017/02/06	2018/02/05
Test Receiver	R&S	ESCS 30	836858/022	2017/04/12	2018/04/11
LISN	R&S	ENV216	100092	2017/07/31	2018/07/30

Note: All equipments that need to calibrate are with calibration period of 1 year.

2.2. Test Setup



2.3. Limits

FCC Part 15 Subpart C Paragraph 15.207 Limits (dBuV)		
Frequency MHz	QP	AV
0.15 - 0.50	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30	60	50

Remark: In the above table, the tighter limit applies at the band edges.

2.4. Test Procedure

The EUT was setup according to ANSI C63.10: 2013 and tested according to DTS test procedure of KDB558074 for compliance to FCC 47CFR 15.247 requirements.

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 block diagram of the test setup and 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 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.

2.5. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.207: 2016

2.6. Uncertainty

The measurement uncertainty is defined as ± 2.26 dB.

2.7. Test Result

EUT using DC input voltage, so the project does not have to test for this Item.

3. Peak Power Output

3.1. Test Equipment

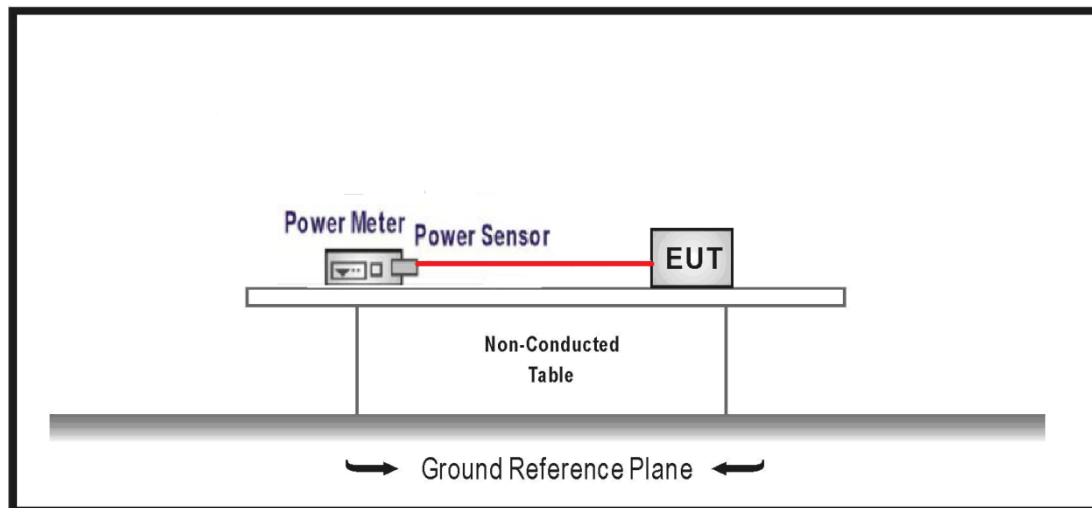
The following test equipments are used during the test:

Peak Power Output / SR10-H

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
Signal & Spectrum Analyzer	R&S	FSV40	101049	2017/01/23	2018/01/22
EXA Signal Analyzer	Keysight	N9010A	MY51440132	2017/03/13	2018/03/12
High Speed Peak Power Meter Dual Input	Anritsu	ML2496A	1602004	2017/01/20	2018/01/19
Pulse Power Sensor	Anritsu	MA2411B	1531043	2017/01/20	2018/01/19
Pulse Power Sensor	Anritsu	MA2411B	1531044	2017/01/20	2018/01/19

Note: All equipments that need to calibrate are with calibration period of 1 year.

3.2. Test Setup



3.3. Test procedures

The EUT was tested according to DTS test procedure section 9.1.2 of KDB558074 D01 V04 measurement to FCC 47CFR 15.247 requirements.

3.4. Limits

The maximum peak power shall be less 1 Watt.

3.5. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.247: 2016

3.6. Uncertainty

The measurement uncertainty is defined as ± 1.27 dB.

3.7. Test Result

Product	Analog GPS Speedometer		
Test Item	Peak Power Output		
Test Mode	Mode 1: Transmitter_Power by PC		
Date of Test	2017/12/06	Test Site	SR10-H

Channel No.	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)
00	2402	4.720	≤ 30.000
39	2441	4.680	≤ 30.000
78	2480	4.710	≤ 30.000

4. Radiated Emission

4.1. Test Equipment

The following test equipments are used during the test:

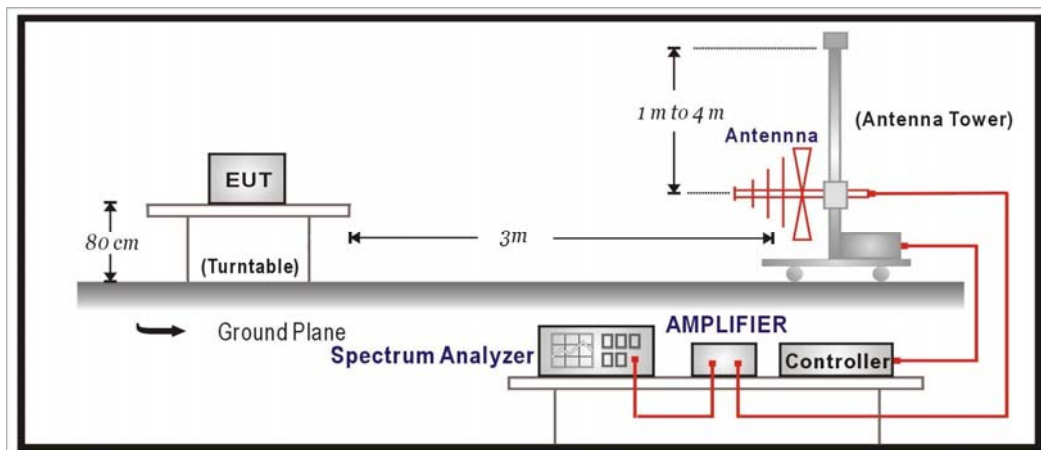
Radiated Emission / CB4-H, CB2-H

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
Signal Analyzer	R&S	FSVA40	101455	2017/11/21	2018/11/20
Signal & Spectrum Analyzer	R&S	FSV40	101049	2017/01/23	2018/01/22
EXA Signal Analyzer	Keysight	N9010A	MY51440132	2017/03/13	2018/03/12
Bilog Antenna	Teseq	CBL6112D	23191	2017/06/28	2018/06/27
Horn Antenna	Schwarzbeck	BBHA 9120D	639	2017/06/14	2018/06/13
Horn Antenna	Schwarzbeck	BBHA 9170	202	2017/02/15	2018/02/14
Pre-Amplifier	RF Bay Inc.	LNA-1330	12162511	2017/03/09	2018/03/08
Pre-Amplifier	EMCI	EMCI 1830I	980366	2017/01/23	2018/01/22
Pre-Amplifier	MITEQ	JS44-45-8P	2014754	2016/12/26	2017/12/25

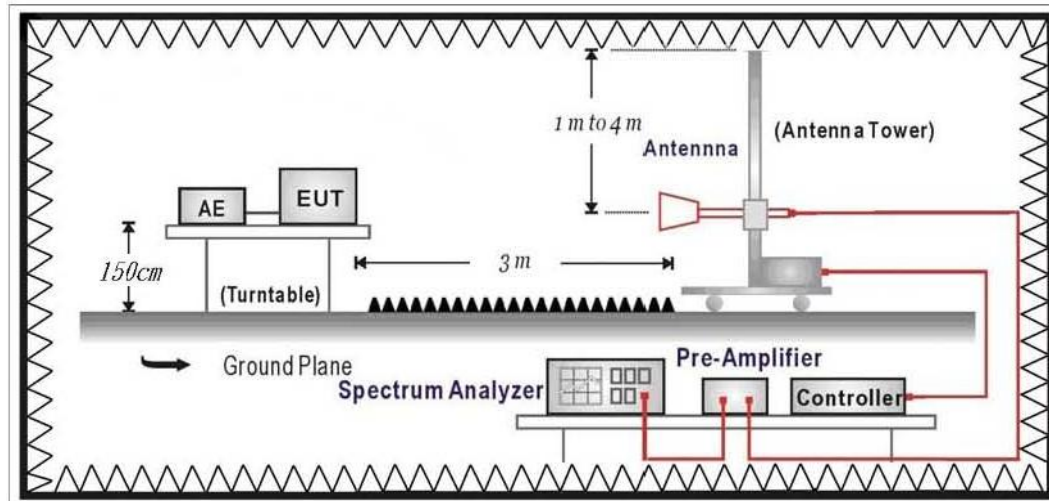
Note: All equipments that need to calibrate are with calibration period of 1 year.

4.2. Test Setup

Under 1GHz Test Setup:



Above 1GHz Test Setup:



4.3. Limits

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 20dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

FCC Part 15 Subpart C Paragraph 15.209 Limits		
Frequency MHz	dBuV/m	dBuV/m
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

Remarks: E field strength (dBuV/m) = 20 log E field strength (uV/m)

4.4. Test Procedure

The EUT was setup according to ANSI C63.10:2013 and tested according to DTS test procedure of KDB558074 D01 V04 for compliance to FCC 47CFR 15.247 requirements. The EUT and its simulators are placed on a turn table which is 1.5 meter above ground (under 1GHz) or 1.5 meter above ground (above 1GHz). The turn table can rotate 360 degrees to determine the position of the maximum emission level.

The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.10 on radiated measurement.

On any frequency or frequencies below or equal to 1000 MHz, the limits shown are based on measuring equipment employing a quasi-peak detector function and on any frequency or frequencies above 1000 MHz the radiated limits shown are based upon the use of measurement instrumentation employing an average detector function. When average radiated emission measurement are included emission measurement below 1000 MHz, there also is a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit. The bandwidth below 1GHz setting on the field strength meter is 120 kHz and above 1GHz is 1MHz.

4.5. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.247: 2016

4.6. Uncertainty

The measurement uncertainty

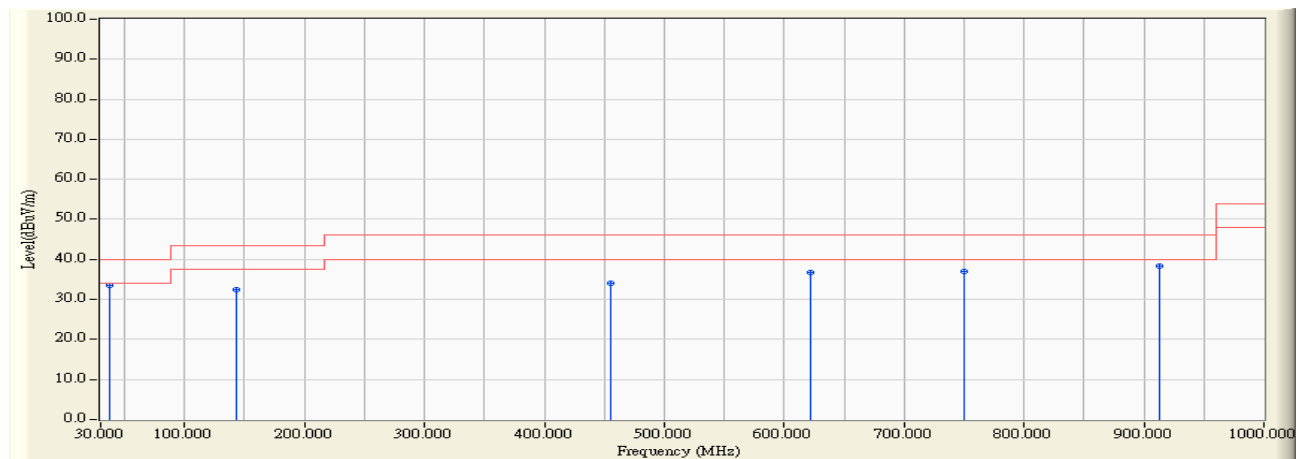
30MHz~1GHz as ± 3.43 dB

1GHz~26.5Ghz as ± 3.65 dB

4.7. Test Result

30MHz-1GHz Spurious

Site : CB4-H	Time : 2018/02/12 - 10:23
Limit : FCC_CLASS_B_03M_QP	Margin : 6
Probe : CB4_FCC_EFS_S2_30M-1GHz_1116 - HORIZONTAL	Power : DC 5V
EUT : Analog GPS Speedometer	Note : Mode 1: Transmitter_Power by PC_2402MHz

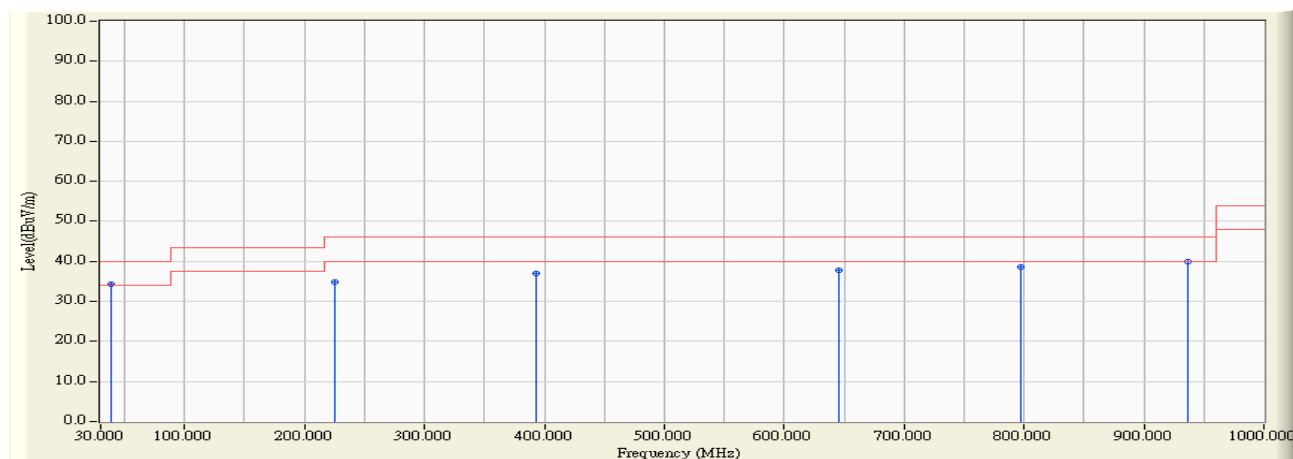


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	36.984	-12.913	46.514	33.600	-6.400	40.000	QUASIPeAK
2		142.714	-21.271	53.730	32.459	-11.041	43.500	QUASIPeAK
3		455.733	-15.325	49.303	33.978	-12.022	46.000	QUASIPeAK
4		621.506	-12.986	49.647	36.661	-9.339	46.000	QUASIPeAK
5		749.934	-11.871	48.841	36.971	-9.029	46.000	QUASIPeAK
6		912.506	-9.697	48.112	38.415	-7.585	46.000	QUASIPeAK

Note:

1. All Reading Levels are Quasi-Peak value.
2. “ * ”, means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Site : CB4-H	Time : 2018/02/12 - 10:23
Limit : FCC_CLASS_B_03M_QP	Margin : 6
Probe : CB4_FCC_EFS_S2_30M-1GHz_1116 - VERTICAL	Power : DC 5V
EUT : Analog GPS Speedometer	Note : Mode 1: Transmitter_Power by PC_2402MHz

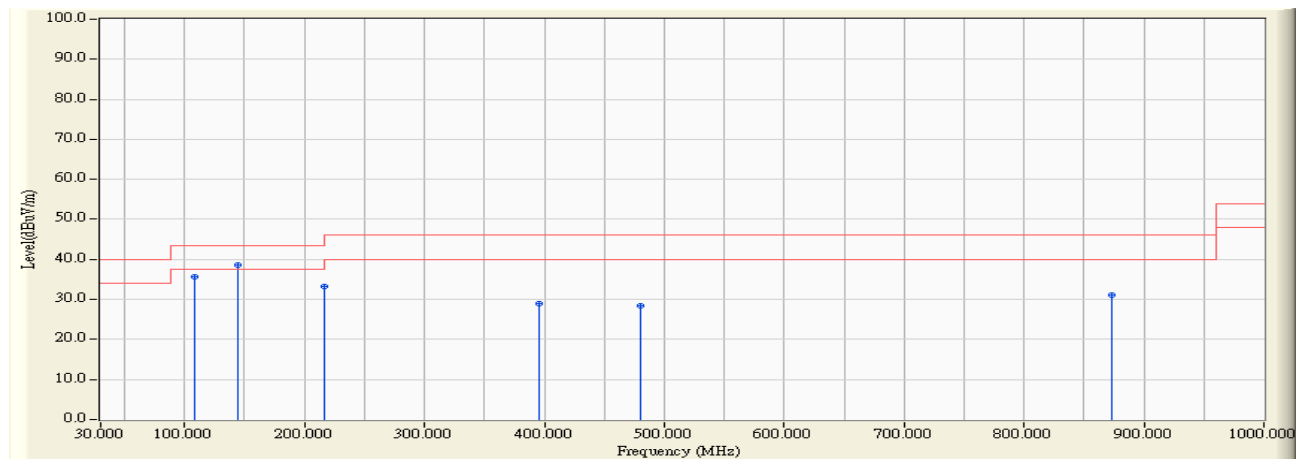


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	38.439	-14.035	48.318	34.283	-5.717	40.000	QUASPEAK
2		224.970	-21.486	56.259	34.773	-11.227	46.000	QUASPEAK
3		392.877	-16.501	53.388	36.886	-9.114	46.000	QUASPEAK
4		645.950	-12.952	50.700	37.749	-8.251	46.000	QUASPEAK
5		797.173	-11.267	49.825	38.558	-7.442	46.000	QUASPEAK
6		936.756	-9.282	49.143	39.861	-6.139	46.000	QUASPEAK

Note:

1. All Reading Levels are Quasi-Peak value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Site : CB4-H	Time : 2017/11/30 - 15:19
Limit : FCC_CLASS_B_03M_QP	Margin : 6
Probe : CB4_FCC_EFS_S2_30M-1GHz_1116 - HORIZONTAL	Power : DC 5V
EUT : Analog GPS Speedometer	Note : Mode 1: Transmitter_Power by PC_2440MHz

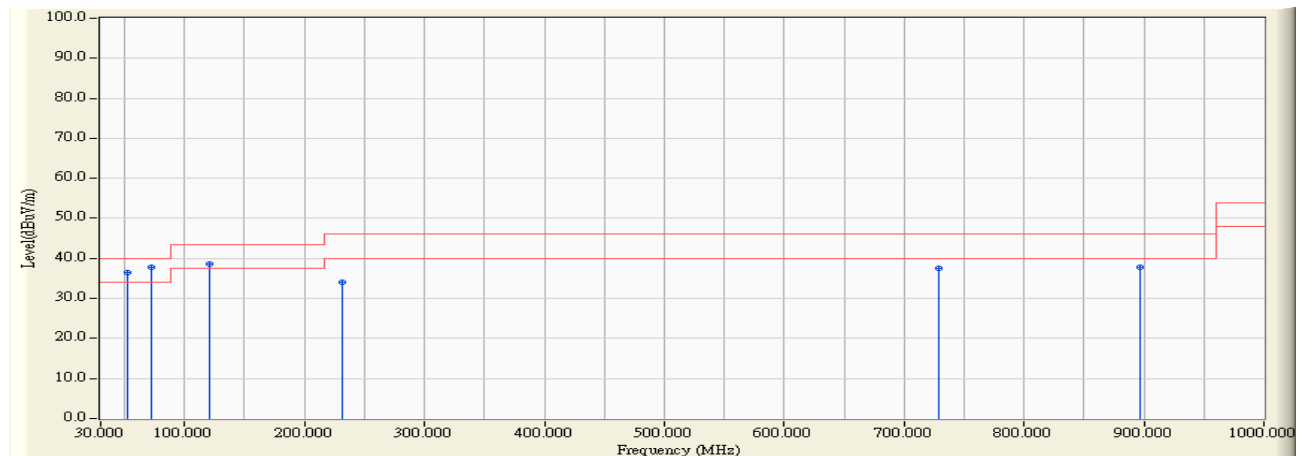


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		108.085	-21.967	57.698	35.731	-7.769	43.500	QUASIPeAK
2	*	143.975	-21.910	60.570	38.660	-4.840	43.500	QUASIPeAK
3		216.240	-22.300	55.602	33.301	-12.699	46.000	QUASIPeAK
4		395.205	-16.376	45.317	28.941	-17.059	46.000	QUASIPeAK
5		480.080	-14.639	43.044	28.405	-17.595	46.000	QUASIPeAK
6		873.415	-10.122	41.207	31.085	-14.915	46.000	QUASIPeAK

Note:

1. All Reading Levels are Quasi-Peak value.
2. “ * ”, means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Site : CB4-H	Time : 2017/11/30 - 15:21
Limit : FCC_CLASS_B_03M_QP	Margin : 6
Probe : CB4_FCC_EFS_S2_30M-1GHz_1116 - VERTICAL	Power : DC 5V
EUT : Analog GPS Speedometer	Note : Mode 1: Transmitter_Power by PC_2440MHz

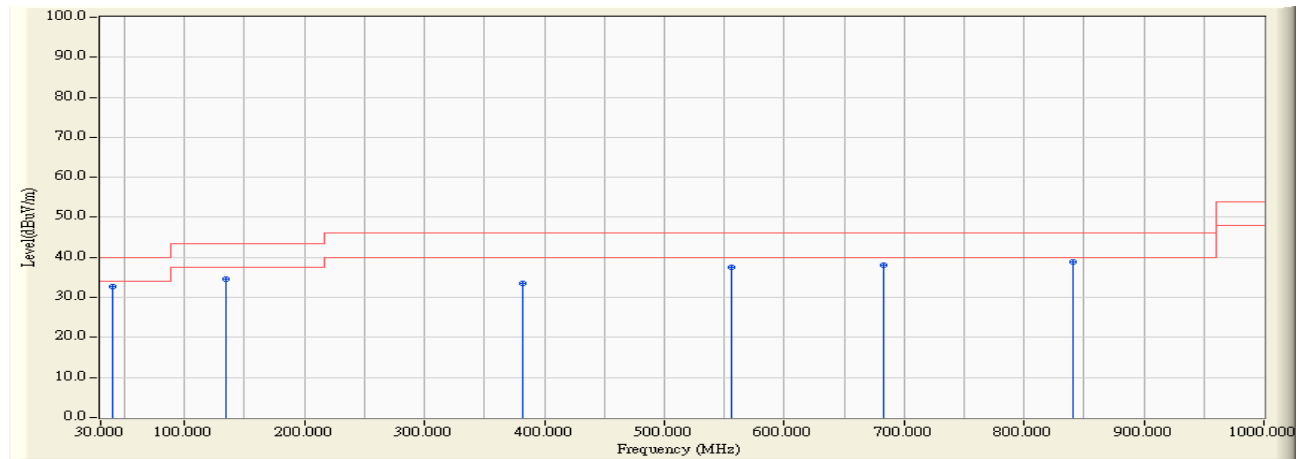


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		52.310	-25.908	62.493	36.585	-3.415	40.000	QUASIPeAK
2	*	72.195	-27.949	65.627	37.679	-2.321	40.000	QUASIPeAK
3		120.210	-20.943	59.587	38.643	-4.857	43.500	QUASIPeAK
4		231.760	-21.389	55.350	33.961	-12.039	46.000	QUASIPeAK
5		729.370	-11.740	49.333	37.594	-8.406	46.000	QUASIPeAK
6		896.210	-9.808	47.687	37.879	-8.121	46.000	QUASIPeAK

Note:

1. All Reading Levels are Quasi-Peak value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Site : CB4-H	Time : 2018/02/12 - 10:26
Limit : FCC_CLASS_B_03M_QP	Margin : 6
Probe : CB4_FCC_EFS_S2_30M-1GHz_1116 - HORIZONTAL	Power : DC 5V
EUT : Analog GPS Speedometer	Note : Mode 1: Transmitter_Power by PC_2480MHz

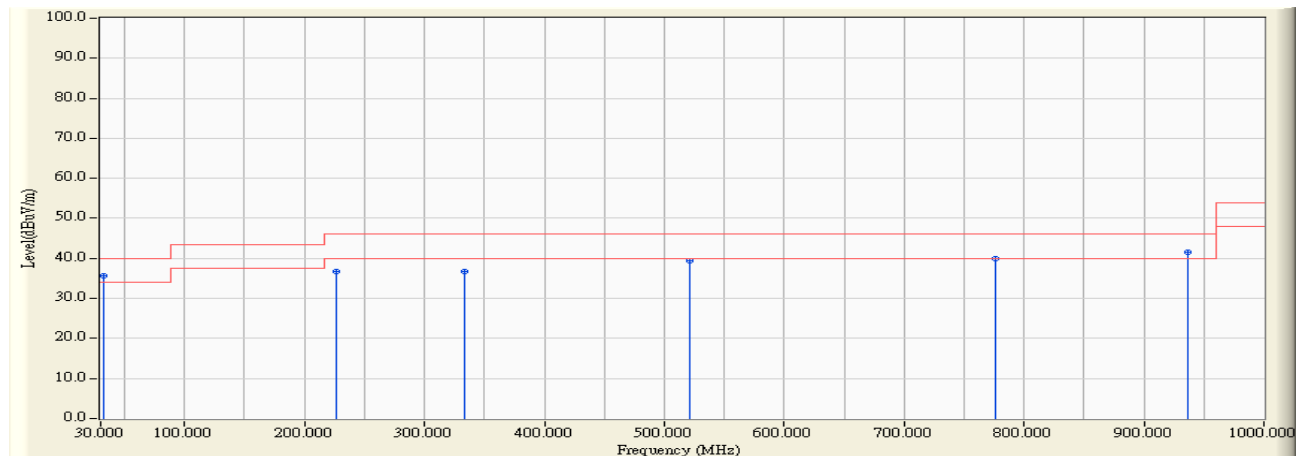


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		39.506	-15.784	48.544	32.761	-7.239	40.000	QUASIPeAK
2		134.081	-20.702	55.307	34.605	-8.895	43.500	QUASIPeAK
3		382.110	-16.778	50.414	33.637	-12.363	46.000	QUASIPeAK
4		555.934	-13.940	51.410	37.470	-8.530	46.000	QUASIPeAK
5		682.616	-12.493	50.472	37.978	-8.022	46.000	QUASIPeAK
6	*	840.241	-10.639	49.582	38.943	-7.057	46.000	QUASIPeAK

Note:

1. All Reading Levels are Quasi-Peak value.
2. “ * ”, means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Site : CB4-H	Time : 2018/02/12 - 10:27
Limit : FCC_CLASS_B_03M_QP	Margin : 6
Probe : CB4_FCC_EFS_S2_30M-1GHz_1116 - VERTICAL	Power : DC 5V
EUT : Analog GPS Speedometer	Note : Mode 1: Transmitter_Power by PC_2480MHz

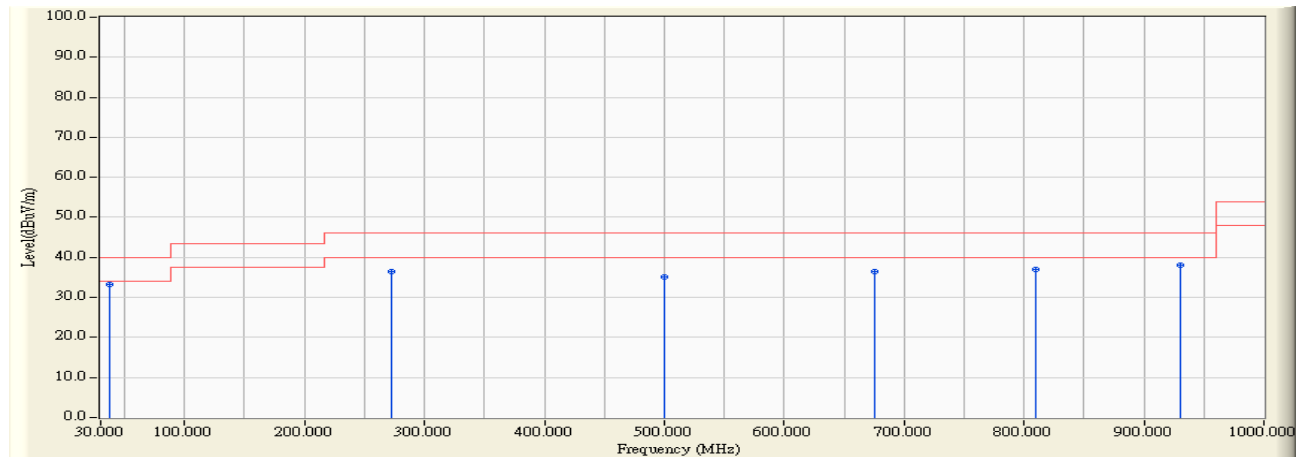


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	31.940	-13.504	49.029	35.526	-4.474	40.000	QUASIPeAK
2		226.328	-21.467	58.158	36.691	-9.309	46.000	QUASIPeAK
3		332.834	-18.322	55.075	36.753	-9.247	46.000	QUASIPeAK
4		520.820	-14.098	53.506	39.409	-6.591	46.000	QUASIPeAK
5		776.221	-11.301	51.189	39.888	-6.112	46.000	QUASIPeAK
6		937.144	-9.293	50.743	41.450	-4.550	46.000	QUASIPeAK

Note:

1. All Reading Levels are Quasi-Peak value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Site : CB4-H	Time : 2018/02/12 - 10:20
Limit : FCC_CLASS_B_03M_QP	Margin : 6
Probe : CB4_FCC_EFS_S2_30M-1GHz_1116 - HORIZONTAL	Power : DC 3.7V(Battery)
EUT : Analog GPS Speedometer	Note : Mode 2: Transmitter_Power by Battery_2402MHz

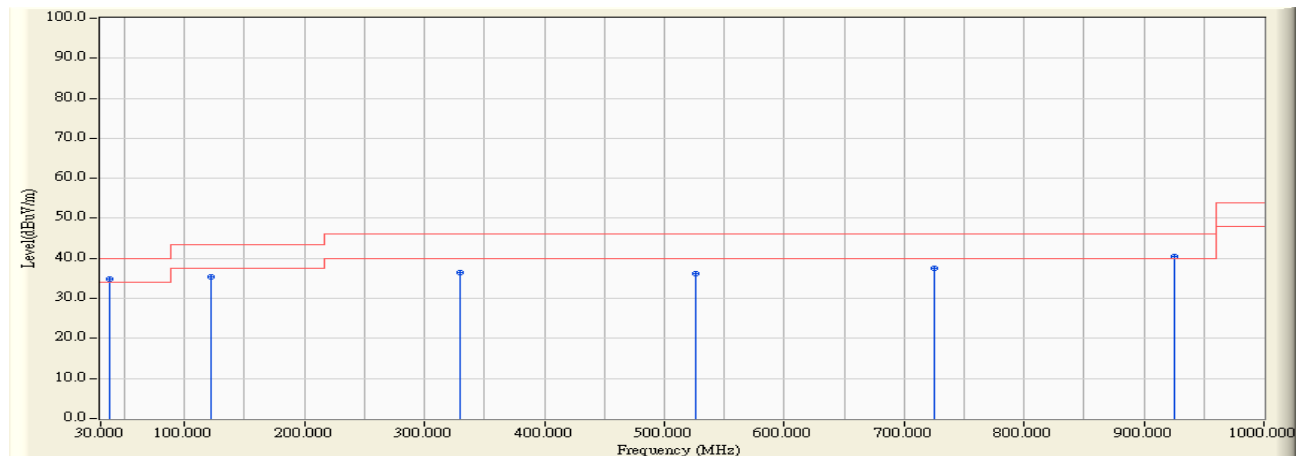


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	37.178	-12.657	46.028	33.371	-6.629	40.000	QUASIPeAK
2		273.082	-20.040	56.382	36.343	-9.657	46.000	QUASIPeAK
3		500.644	-14.527	49.596	35.069	-10.931	46.000	QUASIPeAK
4		675.147	-12.590	49.098	36.507	-9.493	46.000	QUASIPeAK
5		809.880	-11.093	47.968	36.875	-9.125	46.000	QUASIPeAK
6		930.548	-9.501	47.476	37.974	-8.026	46.000	QUASIPeAK

Note:

1. All Reading Levels are Quasi-Peak value.
2. “ * ”, means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Site : CB4-H	Time : 2018/02/12 - 10:20
Limit : FCC_CLASS_B_03M_QP	Margin : 6
Probe : CB4_FCC_EFS_S2_30M-1GHz_1116 - VERTICAL	Power : DC 3.7V(Battery)
EUT : Analog GPS Speedometer	Note : Mode 2: Transmitter_Power by Battery_2402MHz

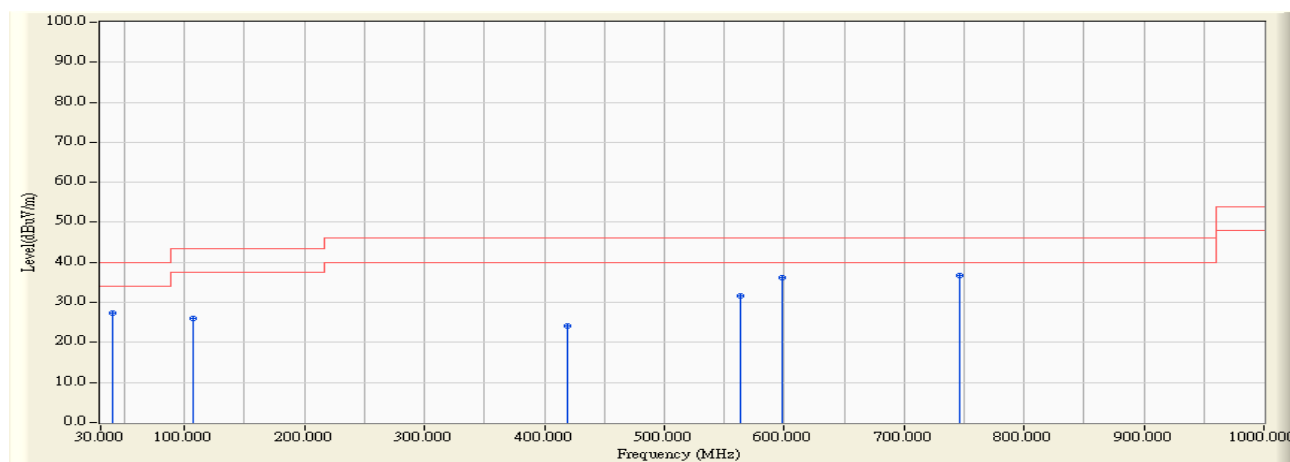


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	37.275	-12.528	47.480	34.952	-5.048	40.000	QUASIPeAK
2		122.053	-20.723	56.238	35.515	-7.985	43.500	QUASIPeAK
3		330.312	-18.516	54.943	36.427	-9.573	46.000	QUASIPeAK
4		525.864	-14.162	50.410	36.248	-9.752	46.000	QUASIPeAK
5		724.811	-11.994	49.495	37.502	-8.498	46.000	QUASIPeAK
6		925.116	-9.577	50.150	40.574	-5.426	46.000	QUASIPeAK

Note:

1. All Reading Levels are Quasi-Peak value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Site : CB4-H	Time : 2017/12/14 - 14:38
Limit : FCC_CLASS_B_03M_QP	Margin : 6
Probe : CB4_FCC_EFS_S2_30M-1GHz_1116 - HORIZONTAL	Power : DC 3.7V(Battery)
EUT : Analog GPS Speedometer	Note : Mode 2: Transmitter_Power by Battery_2440MHz

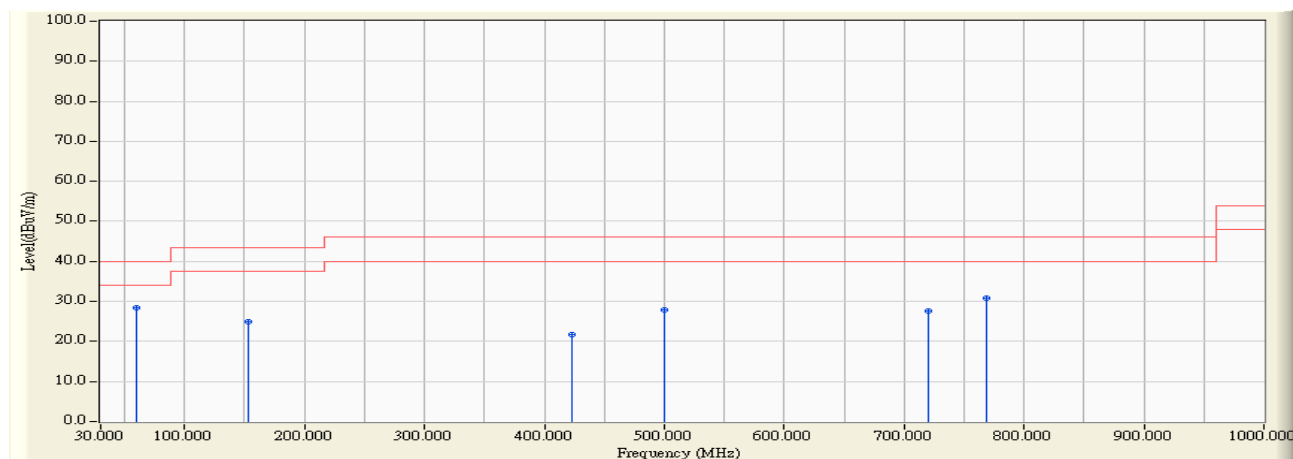


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		39.700	-16.101	43.527	27.426	-12.574	40.000	QUASIPeAK
2		107.115	-22.084	48.036	25.952	-17.548	43.500	QUASIPeAK
3		418.970	-15.913	39.925	24.011	-21.989	46.000	QUASIPeAK
4		563.015	-13.858	45.544	31.687	-14.313	46.000	QUASIPeAK
5		598.905	-13.421	49.552	36.131	-9.869	46.000	QUASIPeAK
6	*	746.830	-11.806	48.409	36.603	-9.397	46.000	QUASIPeAK

Note:

1. All Reading Levels are Quasi-Peak value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Site : CB4-H	Time : 2017/12/14 - 14:49
Limit : FCC_CLASS_B_03M_QP	Margin : 6
Probe : CB4_FCC_EFS_S2_30M-1GHz_1116 - VERTICAL	Power : DC 3.7V(Battery)
EUT : Analog GPS Speedometer	Note : Mode 2: Transmitter_Power by Battery_2440MHz

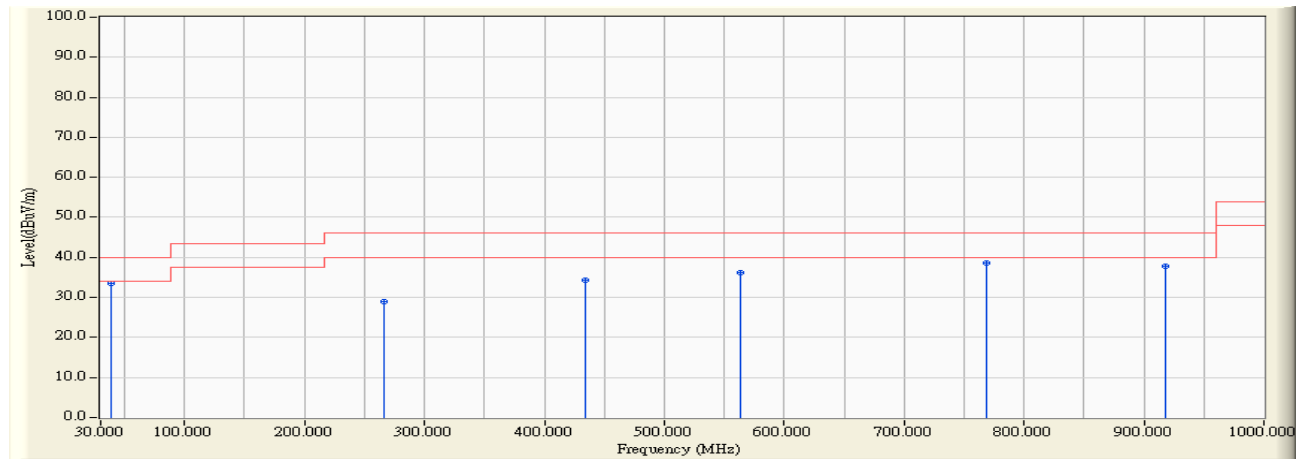


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	60.070	-28.454	56.761	28.306	-11.694	40.000	QUASIPeAK
2		153.675	-22.518	47.499	24.982	-18.518	43.500	QUASIPeAK
3		422.365	-15.944	37.755	21.811	-24.189	46.000	QUASIPeAK
4		499.965	-14.537	42.378	27.841	-18.159	46.000	QUASIPeAK
5		719.670	-12.147	39.856	27.709	-18.291	46.000	QUASIPeAK
6		768.655	-11.637	42.409	30.771	-15.229	46.000	QUASIPeAK

Note:

1. All Reading Levels are Quasi-Peak value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Site : CB4-H	Time : 2018/02/12 - 10:21
Limit : FCC_CLASS_B_03M_QP	Margin : 6
Probe : CB4_FCC_EFS_S2_30M-1GHz_1116 - HORIZONTAL	Power : DC 3.7V(Battery)
EUT : Analog GPS Speedometer	Note : Mode 2: Transmitter_Power by Battery_2480MHz

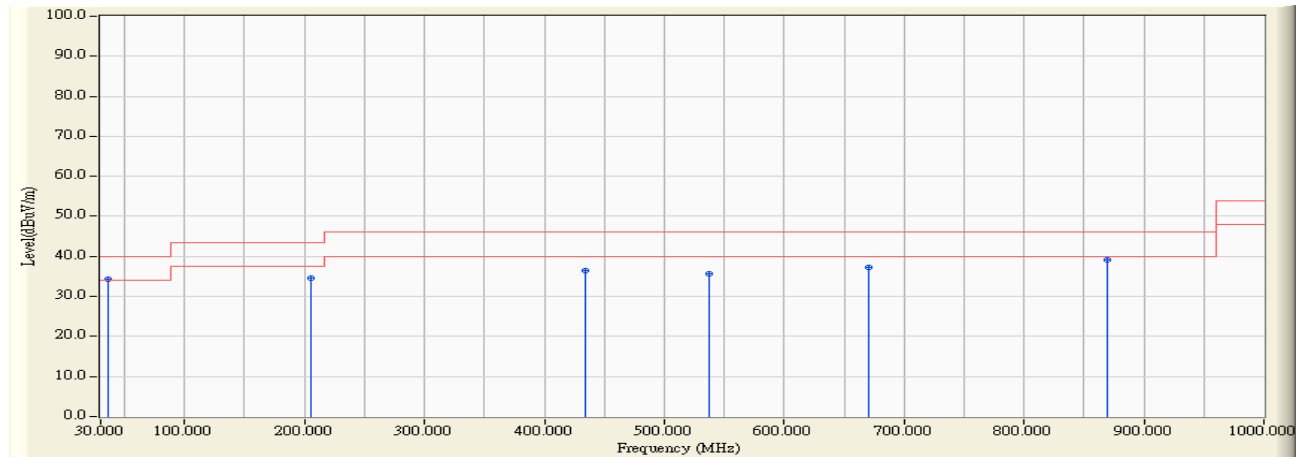


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	38.245	-13.717	47.240	33.523	-6.477	40.000	QUASIPeAK
2		266.777	-20.104	49.163	29.059	-16.941	46.000	QUASIPeAK
3		434.781	-15.582	49.821	34.239	-11.761	46.000	QUASIPeAK
4		563.306	-13.891	49.995	36.104	-9.896	46.000	QUASIPeAK
5		769.043	-11.626	50.251	38.626	-7.374	46.000	QUASIPeAK
6		917.744	-9.685	47.594	37.909	-8.091	46.000	QUASIPeAK

Note:

1. All Reading Levels are Quasi-Peak value.
2. “ * ”, means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Site : CB4-H	Time : 2018/02/12 - 10:21
Limit : FCC_CLASS_B_03M_QP	Margin : 6
Probe : CB4_FCC_EFS_S2_30M-1GHz_1116 - VERTICAL	Power : DC 3.7V(Battery)
EUT : Analog GPS Speedometer	Note : Mode 2: Transmitter_Power by Battery_2480MHz



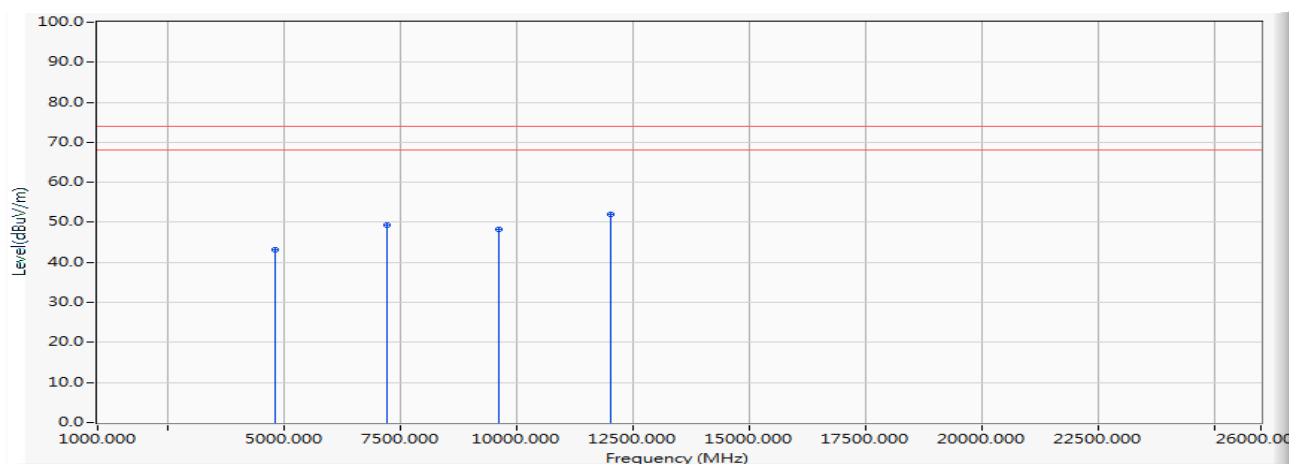
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	36.305	-13.814	48.101	34.287	-5.713	40.000	QUASIPeAK
2		205.764	-22.978	57.493	34.515	-8.985	43.500	QUASIPeAK
3		434.781	-15.582	51.921	36.339	-9.661	46.000	QUASIPeAK
4		537.989	-14.087	49.726	35.638	-10.362	46.000	QUASIPeAK
5		670.782	-12.630	49.964	37.334	-8.666	46.000	QUASIPeAK
6		869.341	-10.310	49.415	39.106	-6.894	46.000	QUASIPeAK

Note:

1. All Reading Levels are Quasi-Peak value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Above 1GHz Spurious :

Site : DEKRA Taiwan CB2-H	Time : 2017/11/30
Limit : FCC_SpartC_15.209_03M_PK	Margin : 6
Probe : CB2_FCC_EFS_B091_1-18GHz_3M_0117 - HORIZONTAL	Power : DC 5V
EUT : Analog GPS Speedometer	Note : Mode 1: Transmitter_Power by PC_2402MHz

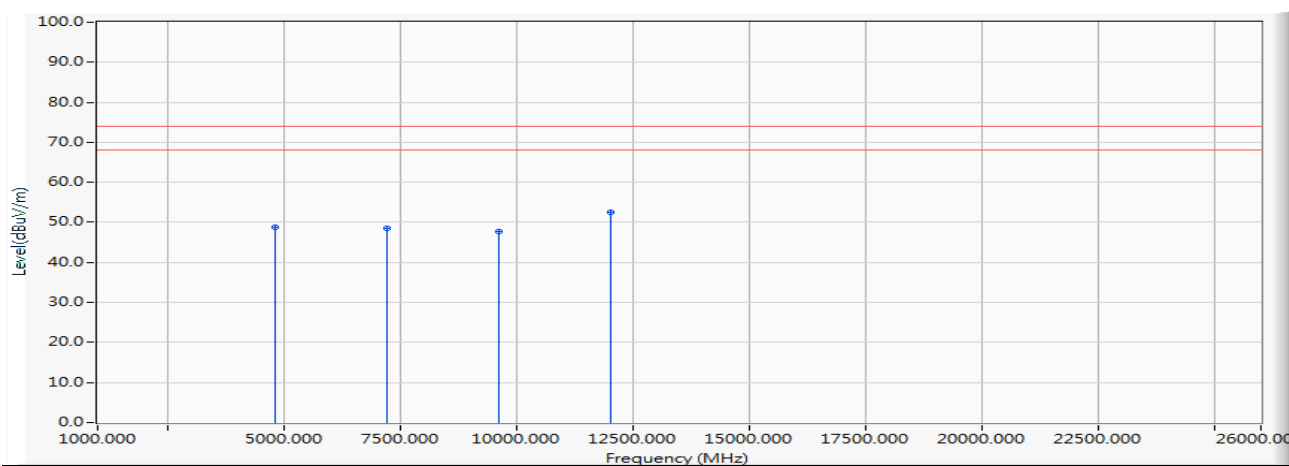


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		4804.000	-0.209	43.400	43.192	-30.808	74.000	PEAK
2		7206.000	6.970	42.230	49.199	-24.801	74.000	PEAK
3		9608.000	12.540	35.630	48.171	-25.829	74.000	PEAK
4	*	12010.000	15.516	36.550	52.066	-21.934	74.000	PEAK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The Emission above 13GHz were not included is because their levels are too low.

Site : DEKRA Taiwan CB2-H	Time : 2017/11/30
Limit : FCC_SpartC_15.209_03M_PK	Margin : 6
Probe : CB2_FCC_EFS_B091_1-18GHz_3M_0117 - VERTICAL	Power : DC 5V
EUT : Analog GPS Speedometer	Note : Mode 1: Transmitter_Power by PC_2402MHz

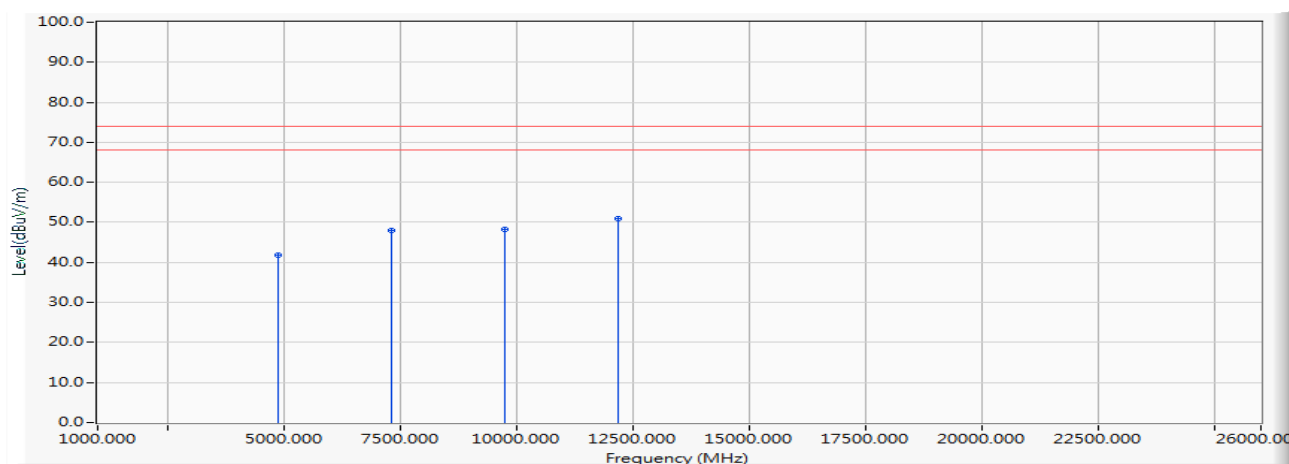


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		4804.000	-0.209	49.040	48.832	-25.168	74.000	PEAK
2		7206.000	6.970	41.670	48.639	-25.361	74.000	PEAK
3		9608.000	12.540	35.200	47.741	-26.259	74.000	PEAK
4	*	12010.000	15.516	37.160	52.676	-21.324	74.000	PEAK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The Emission above 13GHz were not included is because their levels are too low.

Site : DEKRA Taiwan CB2-H	Time : 2017/11/30
Limit : FCC_SpartC_15.209_03M_PK	Margin : 6
Probe : CB2_FCC_EFS_B091_1-18GHz_3M_0117 - HORIZONTAL	Power : DC 5V
EUT : Analog GPS Speedometer	Note : Mode 1: Transmitter_Power by PC_2441MHz

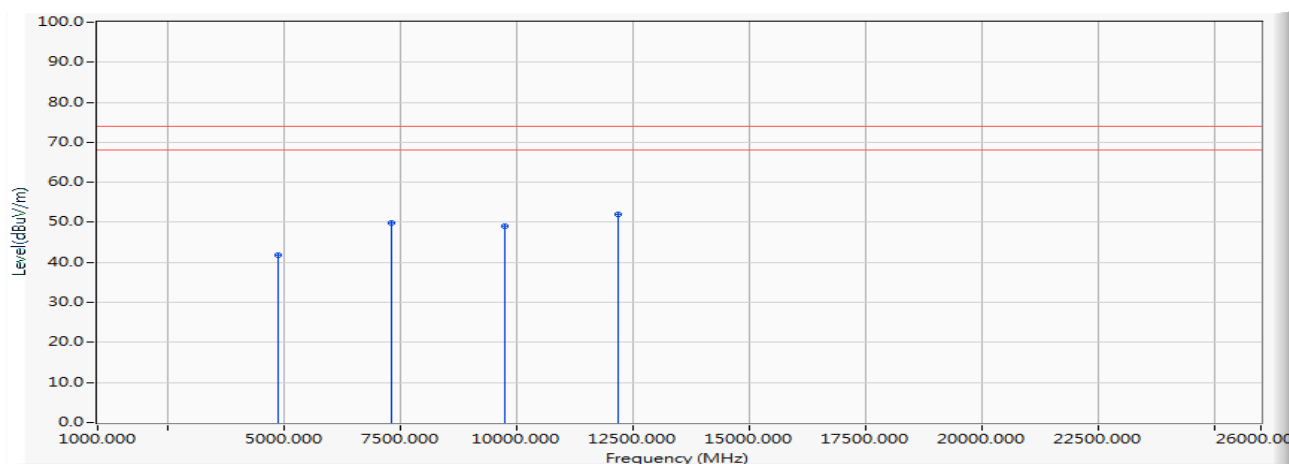


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		4880.000	-0.126	42.030	41.904	-32.096	74.000	PEAK
2		7320.000	7.437	40.460	47.897	-26.103	74.000	PEAK
3		9760.000	12.866	35.470	48.335	-25.665	74.000	PEAK
4	*	12200.000	14.851	36.140	50.992	-23.008	74.000	PEAK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The Emission above 13GHz were not included is because their levels are too low.

Site : DEKRA Taiwan CB2-H	Time : 2017/11/30
Limit : FCC_SpartC_15.209_03M_PK	Margin : 6
Probe : CB2_FCC_EFS_B091_1-18GHz_3M_0117 - VERTICAL	Power : DC 5V
EUT : Analog GPS Speedometer	Note : Mode 1: Transmitter_Power by PC_2441MHz

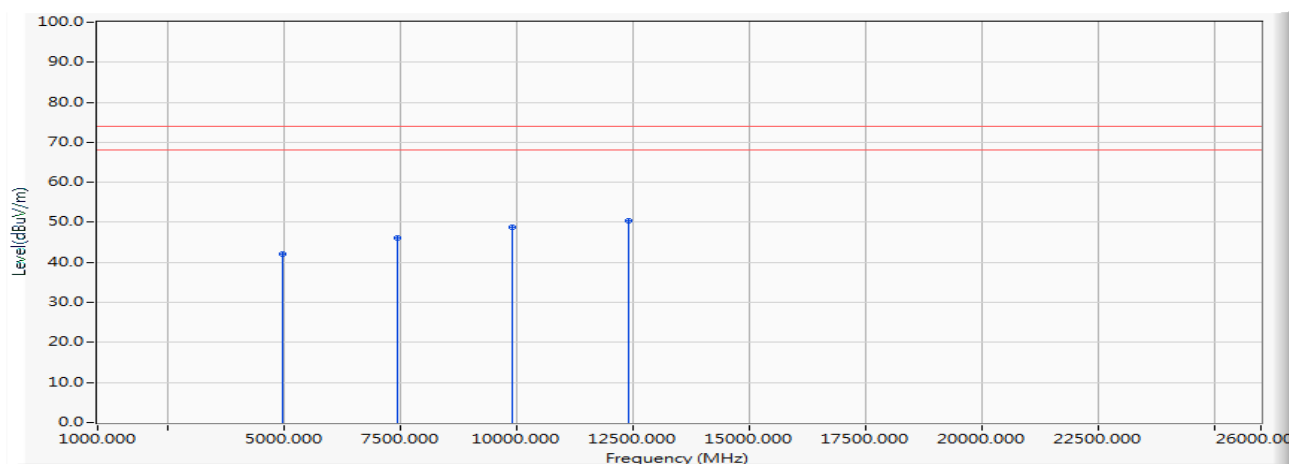


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		4880.000	-0.126	42.020	41.894	-32.106	74.000	PEAK
2		7320.000	7.437	42.450	49.887	-24.113	74.000	PEAK
3		9760.000	12.866	36.110	48.975	-25.025	74.000	PEAK
4	*	12200.000	14.851	37.220	52.072	-21.928	74.000	PEAK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The Emission above 13GHz were not included is because their levels are too low.

Site : DEKRA Taiwan CB2-H	Time : 2017/11/30
Limit : FCC_SpartC_15.209_03M_PK	Margin : 6
Probe : CB2_FCC_EFS_B091_1-18GHz_3M_0117 - HORIZONTAL	Power : DC 5V
EUT : Analog GPS Speedometer	Note : Mode 1: Transmitter_Power by PC_2480MHz

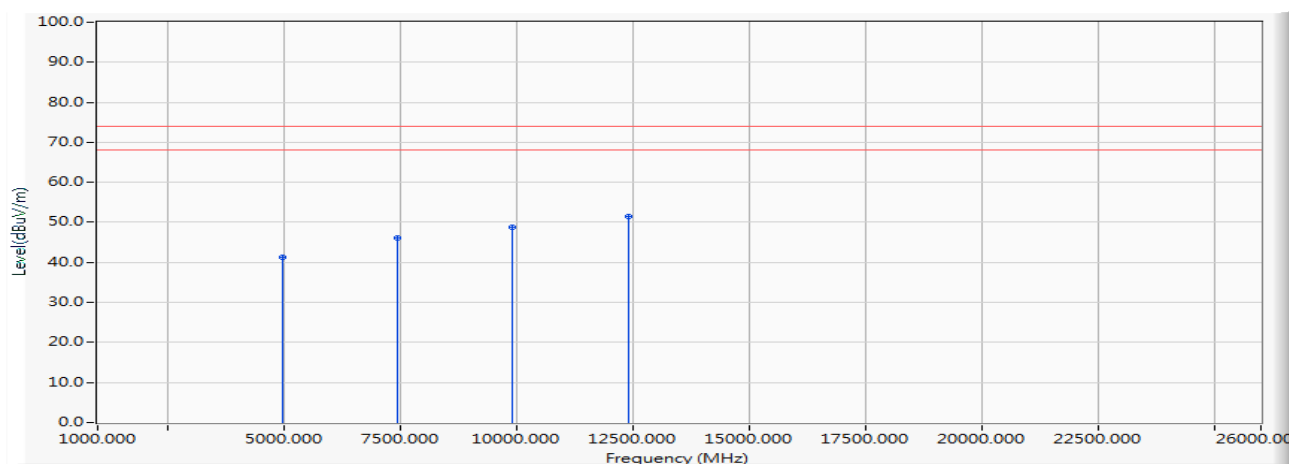


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		4960.000	-0.034	42.080	42.046	-31.954	74.000	PEAK
2		7440.000	7.868	38.280	46.148	-27.852	74.000	PEAK
3		9920.000	13.091	35.670	48.761	-25.239	74.000	PEAK
4	*	12400.000	15.733	34.640	50.373	-23.627	74.000	PEAK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The Emission above 13GHz were not included is because their levels are too low.

Site : DEKRA Taiwan CB2-H	Time : 2017/11/30
Limit : FCC_SpartC_15.209_03M_PK	Margin : 6
Probe : CB2_FCC_EFS_B091_1-18GHz_3M_0117 - VERTICAL	Power : DC 5V
EUT : Analog GPS Speedometer	Note : Mode 1: Transmitter_Power by PC_2480MHz



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		4960.000	-0.034	41.360	41.326	-32.674	74.000	PEAK
2		7440.000	7.868	38.300	46.168	-27.832	74.000	PEAK
3		9920.000	13.091	35.740	48.831	-25.169	74.000	PEAK
4	*	12400.000	15.733	35.850	51.583	-22.417	74.000	PEAK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The Emission above 13GHz were not included is because their levels are too low.

5. RF antenna conducted test

5.1. Test Equipment

The following test equipments are used during the test:

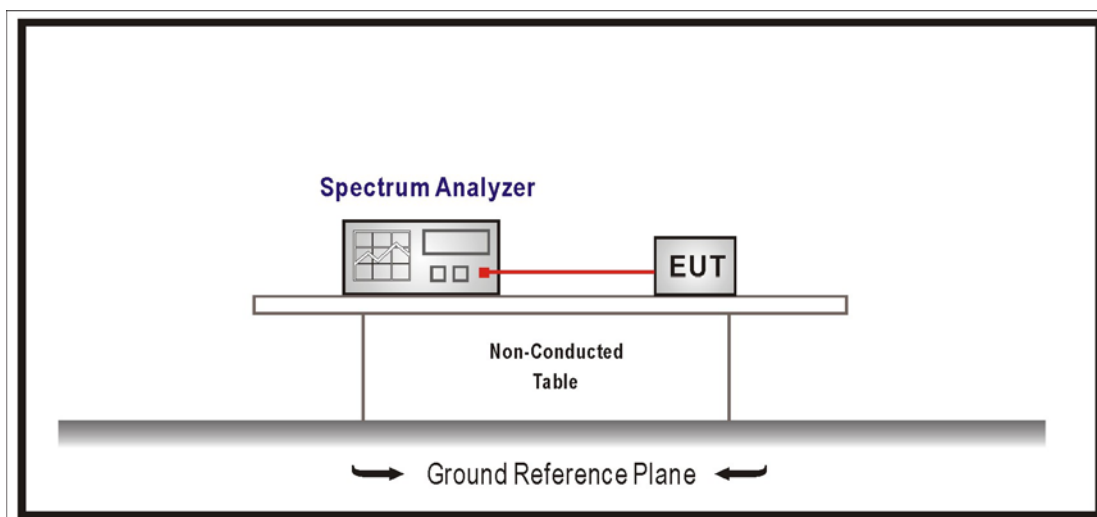
RF antenna conducted test / SR10-H

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
Signal & Spectrum Analyzer	R&S	FSV40	101049	2017/01/23	2018/01/22
EXA Signal Analyzer	Keysight	N9010A	MY51440132	2017/03/13	2018/03/12

Note: All equipments that need to calibrate are with calibration period of 1 year.

5.2. Test Setup

RF Antenna Conducted Measurement:



5.3. Limits

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum 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 an RF conducted or radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, 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) (see Section 15.205(c)).

5.4. Test Procedure

The EUT was setup according to ANSI C63.10: 2013 and tested according to DTS test procedure section 11.2 of KDB558074 D01 V04 for compliance to FCC 47CFR 15.247 requirements. Set RBW = 100 kHz, Set VBW> RBW, scan up through 10th harmonic.

5.5. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.247: 2016

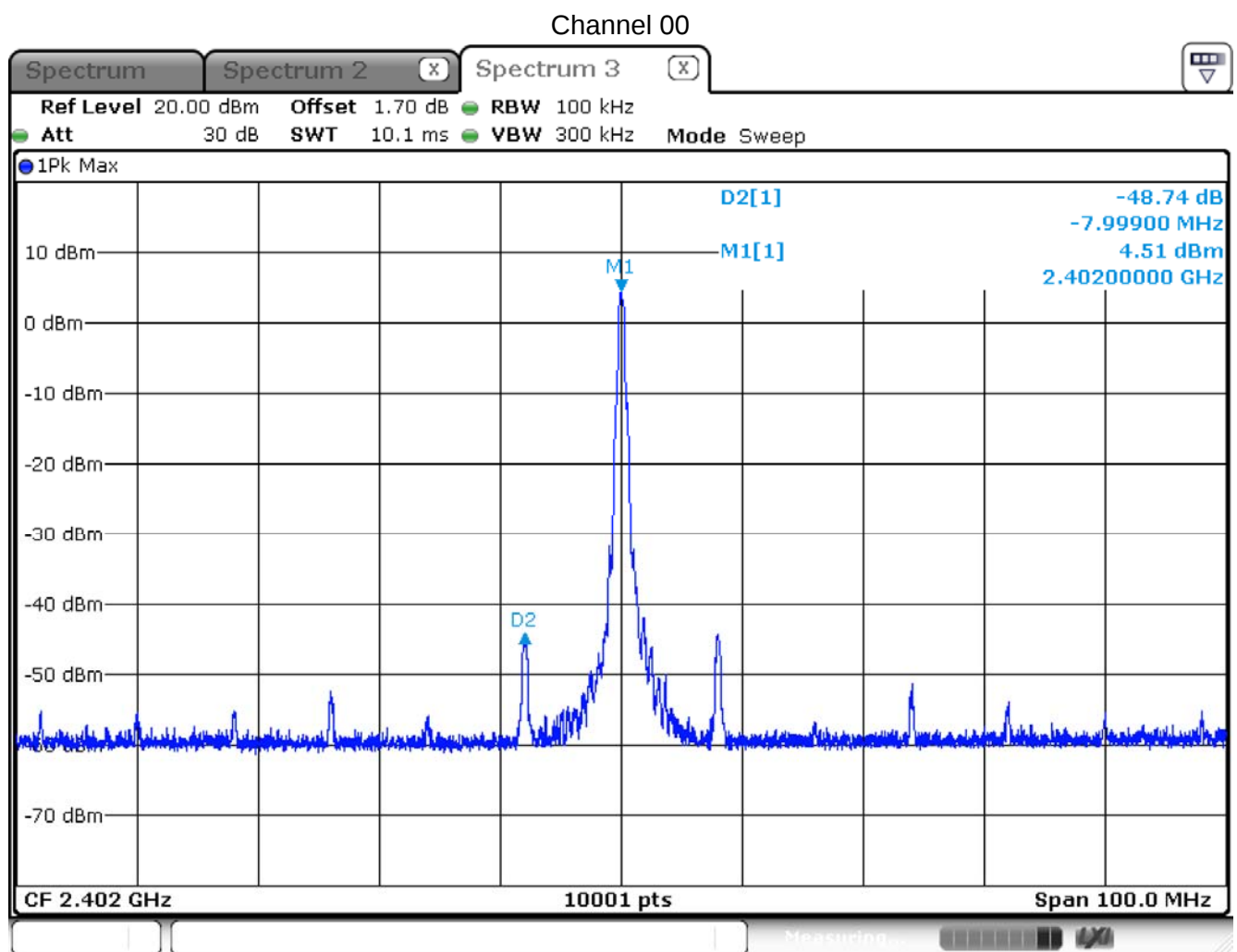
5.6. Uncertainty

Conducted is defined as $\pm 1.27\text{dB}$

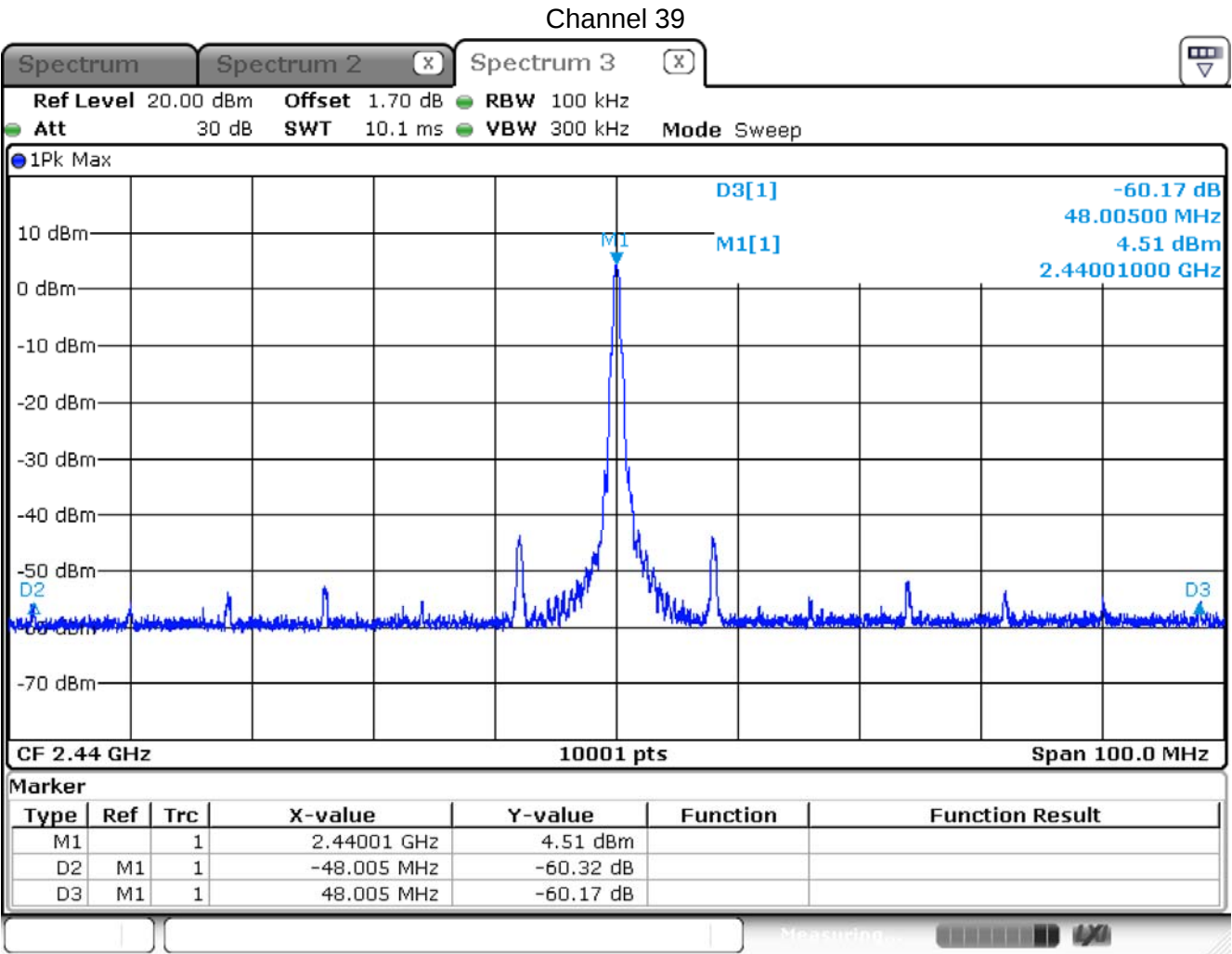
5.7. Test Result

Product	Analog GPS Speedometer		
Test Item	RF antenna conducted test		
Test Mode	Mode 1: Transmitter Power by PC		
Date of Test	2017/12/04	Test Site	SR10-H

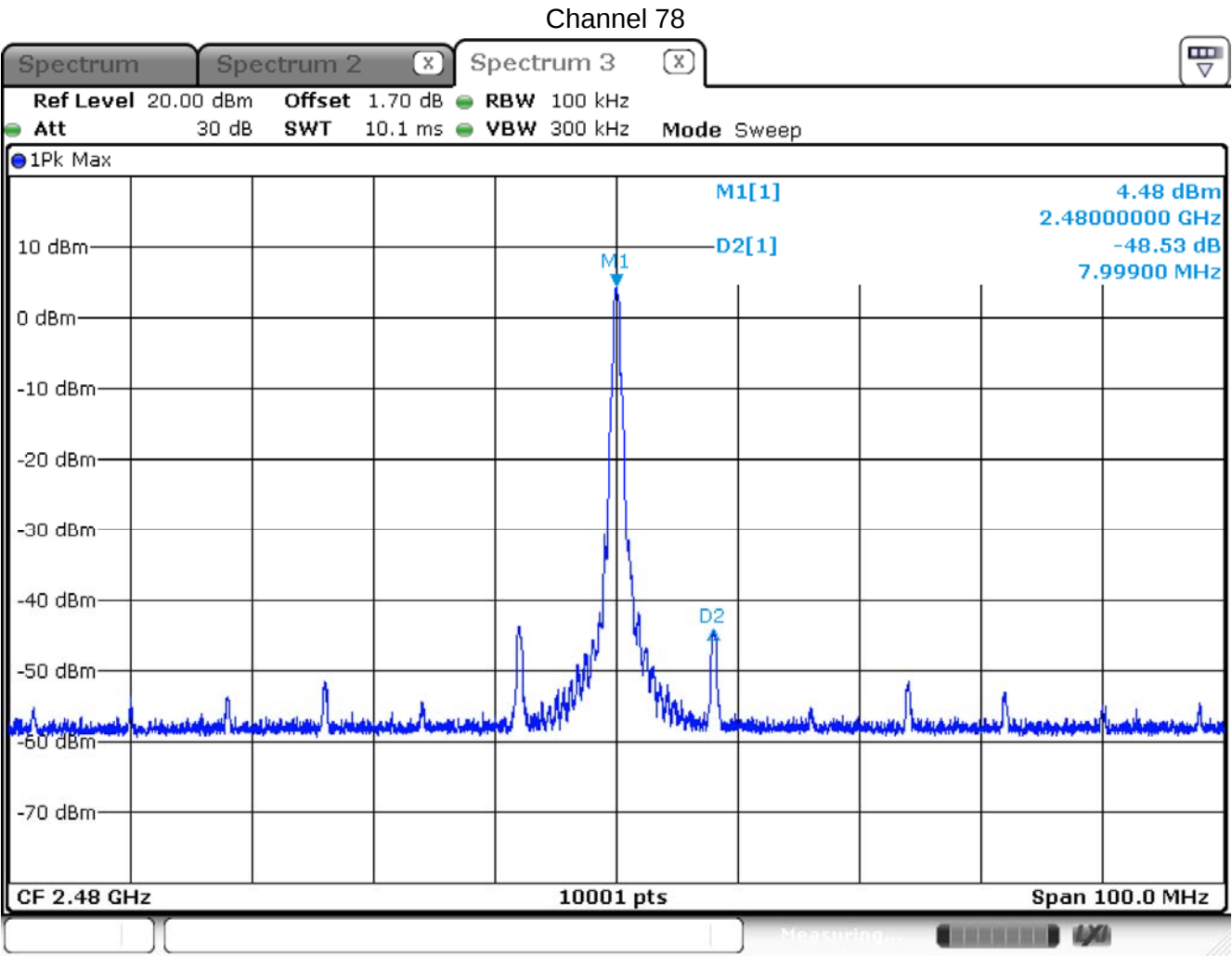
Channel	Frequency (MHz)	Measure Level (dBc)	Limit (dBc)	Result
00	2402	48.740	≥ 20.000	Pass
39	2441	60.170	≥ 20.000	Pass
78	2480	48.530	≥ 20.000	Pass



Date: 4.DEC.2017 15:19:55



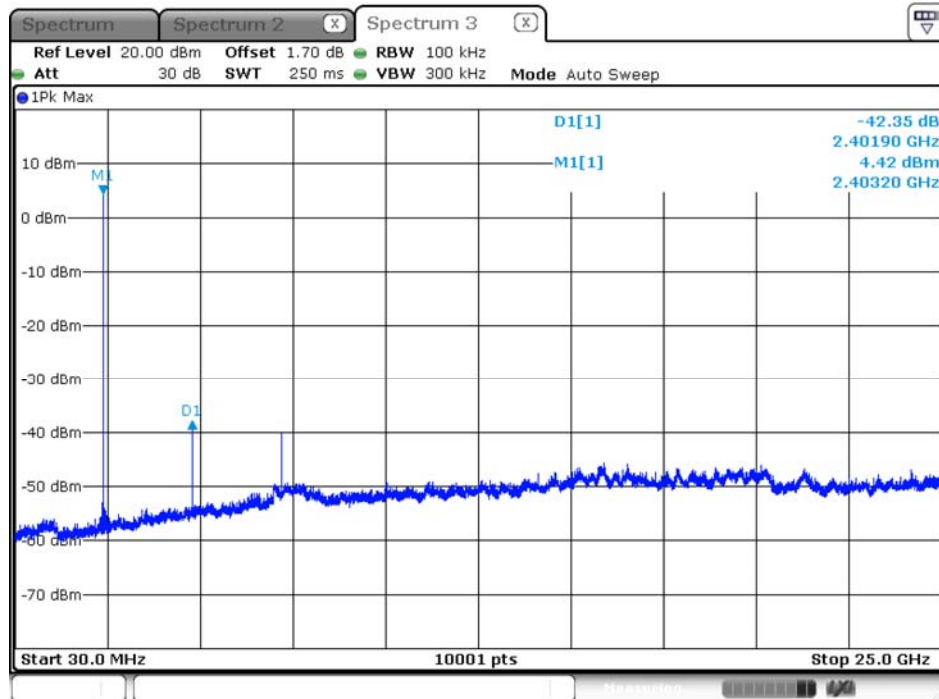
Date: 4.DEC.2017 15:11:19



Date: 4.DEC.2017 15:06:03

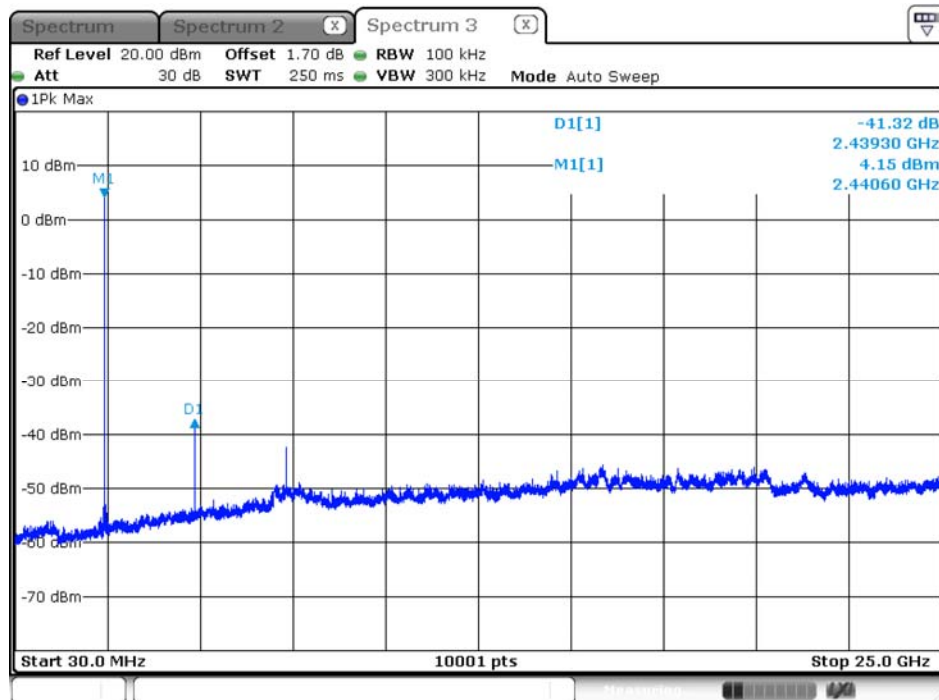
Product	Analog GPS Speedometer		
Test Item	RF antenna conducted test		
Test Mode	Mode 1: Transmitter_Power by PC		
Date of Test	2017/12/04	Test Site	SR10-H

Channel 00 (30MHz-25GHz)- GFSK



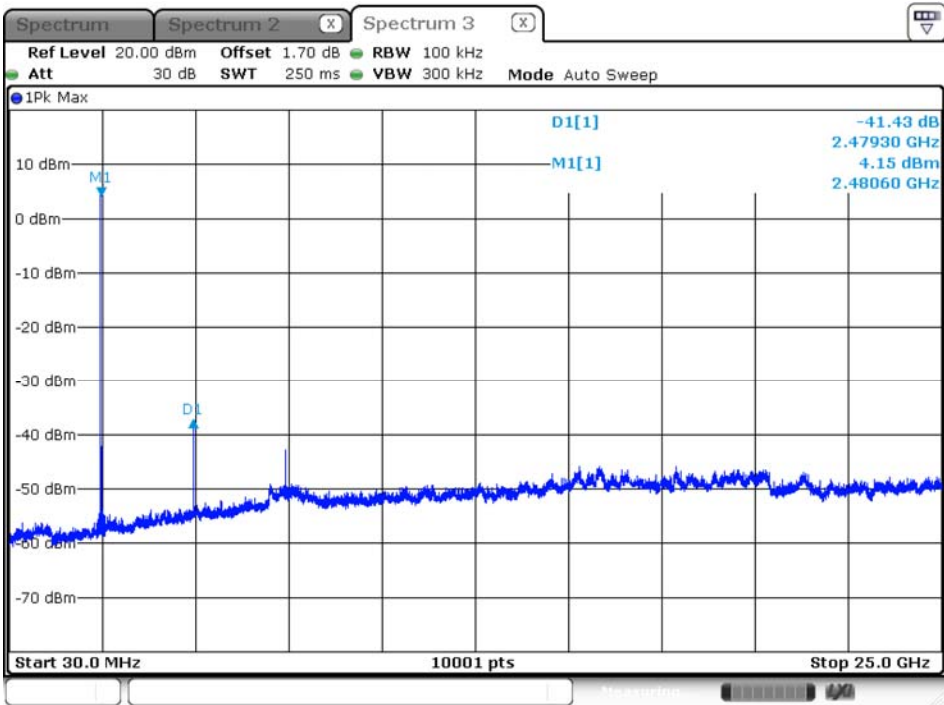
Date: 4.DEC.2017 14:14:00

Channel 39 (30MHz-25GHz)- GFSK



Date: 4.DEC.2017 14:23:43

Channel 78 (30MHz-25GHz)- GFSK



Date: 4 DEC 2017 14:34:57

6. Band Edge

6.1. Test Equipment

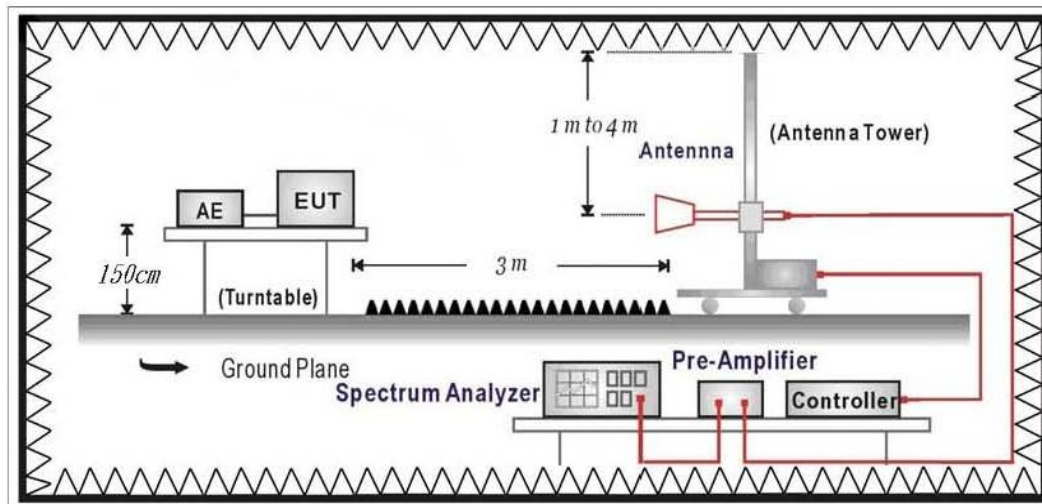
The following test equipments are used during the test:

Band Edge / CB4-H

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
Signal Analyzer	R&S	FSVA40	101455	2017/11/21	2018/11/20
Signal & Spectrum Analyzer	R&S	FSV40	101049	2017/01/23	2018/01/22
EXA Signal Analyzer	Keysight	N9010A	MY51440132	2017/03/13	2018/03/12
Bilog Antenna	Teseq	CBL6112D	23191	2017/06/28	2018/06/27
Horn Antenna	Schwarzbeck	BBHA 9120D	639	2017/06/14	2018/06/13
Horn Antenna	Schwarzbeck	BBHA 9170	202	2017/02/15	2018/02/14
Pre-Amplifier	RF Bay Inc.	LNA-1330	12162511	2017/03/09	2018/03/08
Pre-Amplifier	EMCI	EMCI 1830I	980366	2017/01/23	2018/01/22
Pre-Amplifier	MITEQ	JS44-45-8P	2014754	2016/12/26	2017/12/25

Note: All equipments that need to calibrate are with calibration period of 1 year.

6.2. Test Setup



6.3. Limits

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 20dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

6.4. Test Procedure

The EUT was setup according to ANSI C63.10:2013 and tested according to DTS test procedure of KDB558074 D01 V04 for compliance to FCC 47CFR 15.247 requirements. The EUT and its simulators are placed on a turn table which is 1.5 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.10:2013 on radiated measurement.

6.5. Test Specification

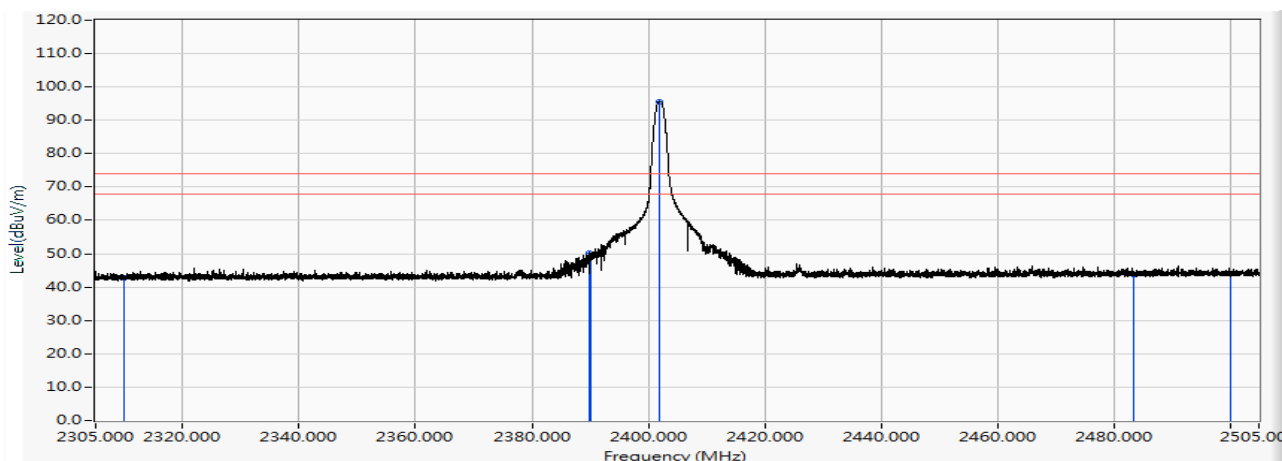
According to FCC Part 15 Subpart C Paragraph 15.247: 2016

6.6. Uncertainty

The measurement uncertainty
 ± 3.9 dB above 1GHz

6.7. Test Result

Site : DEKRA Taiwan CB2-H	Time : 2017/11/29
Limit : FCC_SpartC_15.209_03M_PK	Margin : 6
Probe : CB2_FCC_EFS_B091_1-18GHz_3M_0117 - HORIZONTAL	Power : DC 5V
EUT : Analog GPS Speedometer	Note : Mode 1: Transmitter_Power by PC_2402MHz

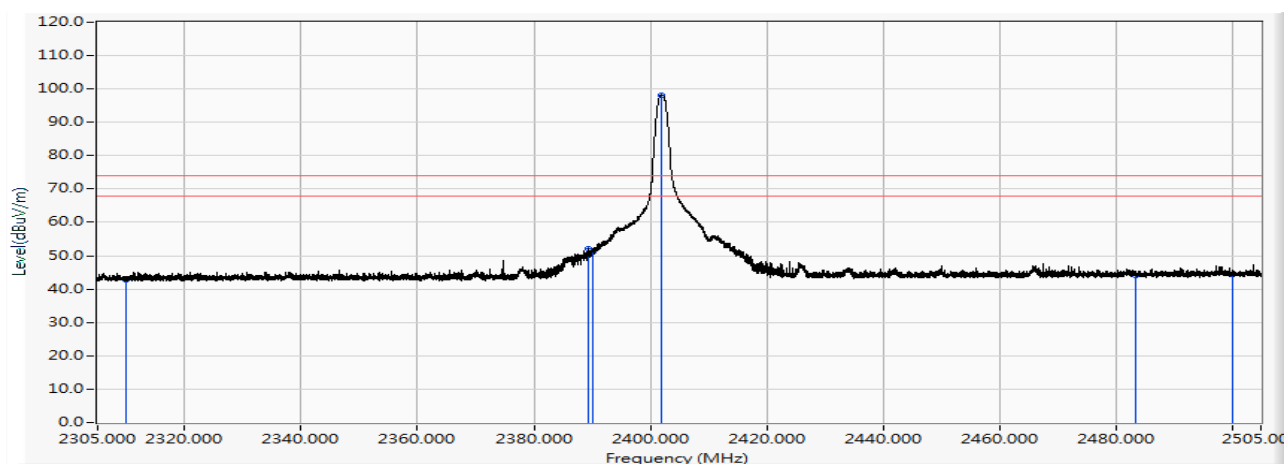


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		2310.000	12.384	30.360	42.744	-31.256	74.000	PEAK
2		2389.760	12.910	37.369	50.279	-23.721	74.000	PEAK
3		2390.000	12.911	36.284	49.195	-24.805	74.000	PEAK
4	*	2401.980	12.990	82.635	95.625	21.625	74.000	PEAK
5		2483.500	13.527	30.299	43.826	-30.174	74.000	PEAK
6		2500.000	13.629	30.390	44.019	-29.981	74.000	PEAK

Note:

1. All Readings below 1GHz are Peak, above are performed with peak and/or average measurements as necessary.
2. “ * ”, means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.
4. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Site : DEKRA Taiwan CB2-H	Time : 2017/11/29
Limit : FCC_SpartC_15.209_03M_PK	Margin : 6
Probe : CB2_FCC_EFS_B091_1-18GHz_3M_0117 - VERTICAL	Power : DC 5V
EUT : Analog GPS Speedometer	Note : Mode 1: Transmitter_Power by PC_2402MHz

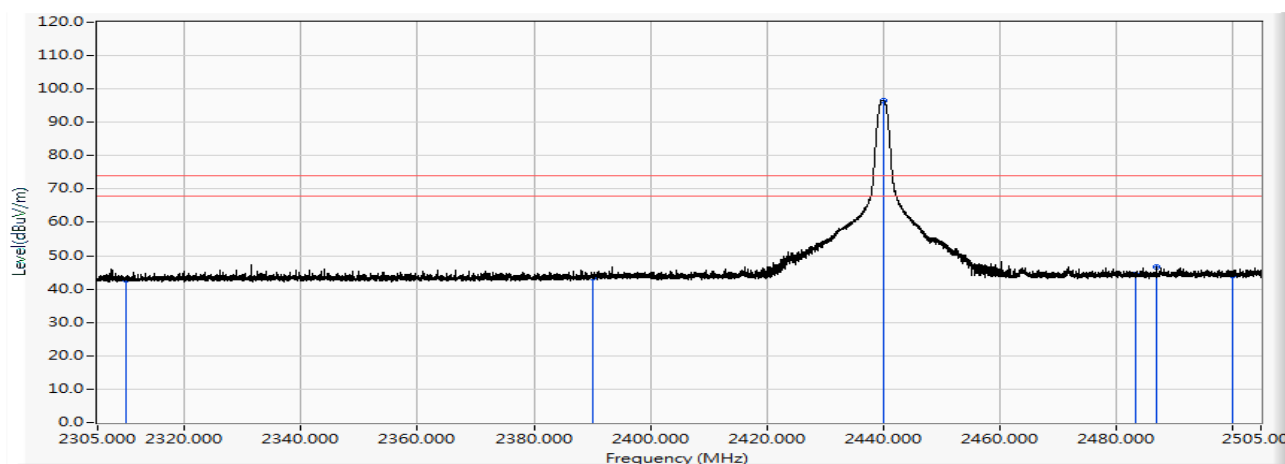


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		2310.000	12.384	30.491	42.875	-31.125	74.000	PEAK
2		2389.300	12.906	39.109	52.016	-21.984	74.000	PEAK
3		2390.000	12.911	38.148	51.059	-22.941	74.000	PEAK
4	*	2401.980	12.990	85.165	98.155	24.155	74.000	PEAK
5		2483.500	13.527	30.450	43.977	-30.023	74.000	PEAK
6		2500.000	13.629	30.654	44.283	-29.717	74.000	PEAK

Note:

1. All Readings below 1GHz are Peak, above are performed with peak and/or average measurements as necessary.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.
4. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Site : DEKRA Taiwan CB2-H	Time : 2017/11/29
Limit : FCC_SpartC_15.209_03M_PK	Margin : 6
Probe : CB2_FCC_EFS_B091_1-18GHz_3M_0117 - HORIZONTAL	Power : DC 5V
EUT : Analog GPS Speedometer	Note : Mode 1: Transmitter_Power by PC_2441MHz

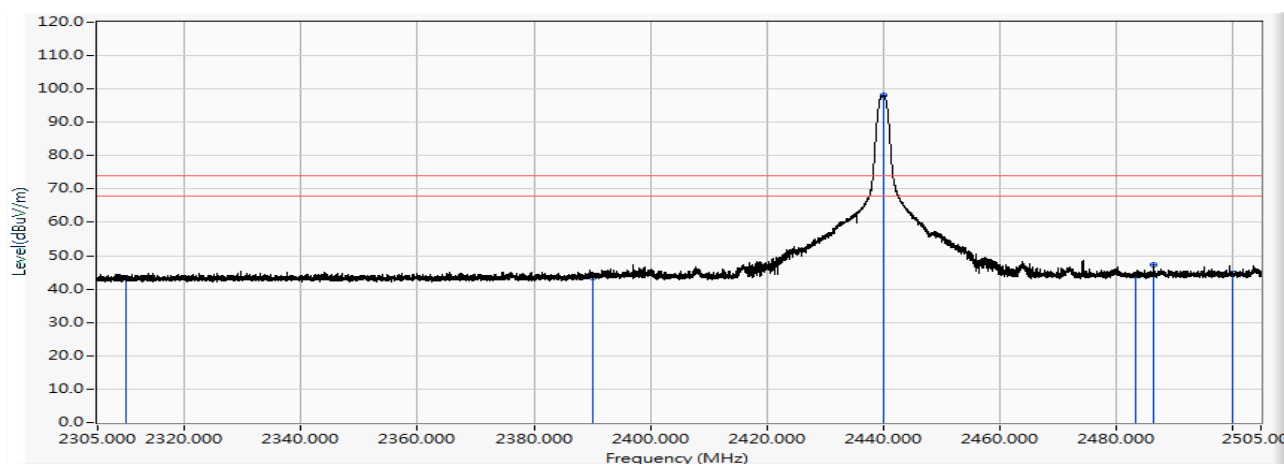


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		2310.000	12.384	30.444	42.828	-31.172	74.000	PEAK
2		2390.000	12.911	30.638	43.549	-30.451	74.000	PEAK
3	*	2440.000	13.241	83.189	96.430	22.430	74.000	PEAK
4		2483.500	13.527	30.843	44.370	-29.630	74.000	PEAK
5		2487.120	13.552	33.225	46.776	-27.224	74.000	PEAK
6		2500.000	13.629	30.549	44.178	-29.822	74.000	PEAK

Note:

1. All Readings below 1GHz are Peak, above are performed with peak and/or average measurements as necessary.
2. “ * ”, means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.
4. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Site : DEKRA Taiwan CB2-H	Time : 2017/11/29
Limit : FCC_SpartC_15.209_03M_PK	Margin : 6
Probe : CB2_FCC_EFS_B091_1-18GHz_3M_0117 - VERTICAL	Power : DC 5V
EUT : Analog GPS Speedometer	Note : Mode 1: Transmitter_Power by PC_2441MHz

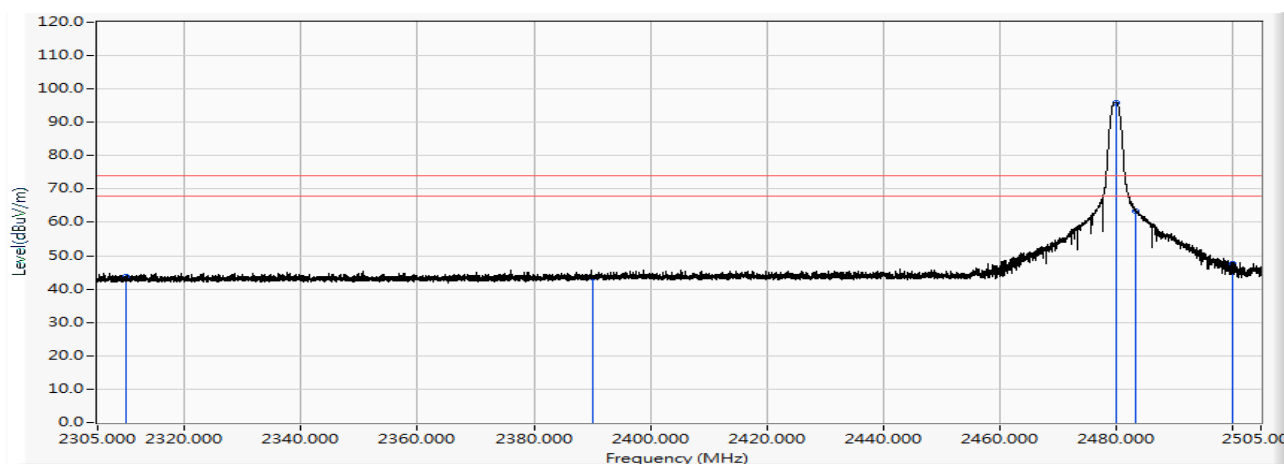


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		2310.000	12.384	30.969	43.353	-30.647	74.000	PEAK
2		2390.000	12.911	30.625	43.536	-30.464	74.000	PEAK
3	*	2440.000	13.241	84.735	97.976	23.976	74.000	PEAK
4		2483.500	13.527	30.578	44.105	-29.895	74.000	PEAK
5		2486.600	13.548	33.739	47.287	-26.713	74.000	PEAK
6		2500.000	13.629	31.060	44.689	-29.311	74.000	PEAK

Note:

1. All Readings below 1GHz are Peak, above are performed with peak and/or average measurements as necessary.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.
4. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Site : DEKRA Taiwan CB2-H	Time : 2017/11/29
Limit : FCC_SpartC_15.209_03M_PK	Margin : 6
Probe : CB2_FCC_EFS_B091_1-18GHz_3M_0117 - HORIZONTAL	Power : DC 5V
EUT : Analog GPS Speedometer	Note : Mode 1: Transmitter_Power by PC_2480MHz

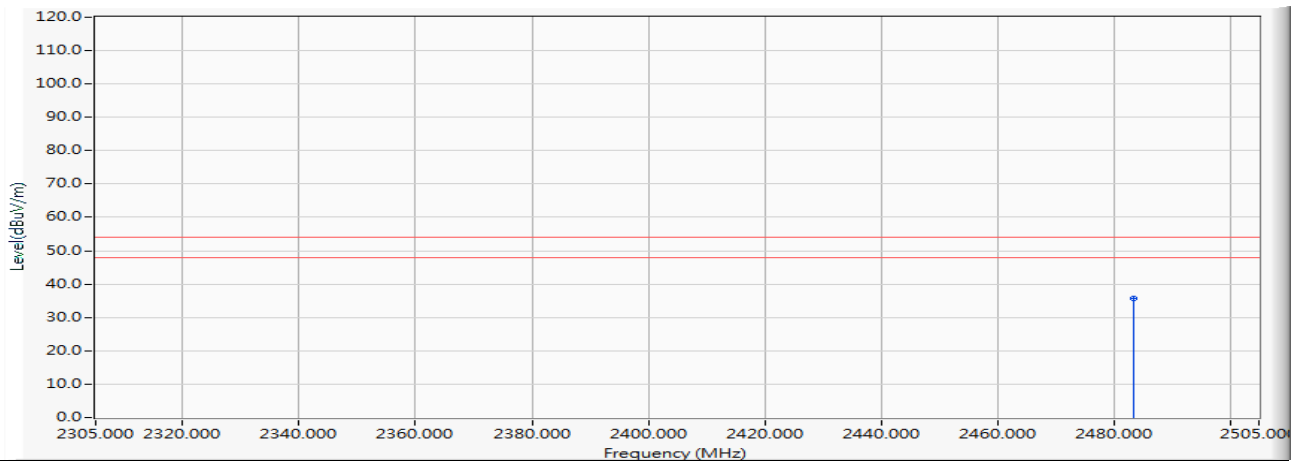


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		2310.000	12.384	31.492	43.876	-30.124	74.000	PEAK
2		2390.000	12.911	30.674	43.585	-30.415	74.000	PEAK
3	*	2480.000	13.504	82.474	95.978	21.978	74.000	PEAK
4		2483.500	13.527	49.911	63.438	-10.562	74.000	PEAK
5		2483.520	13.527	49.938	63.465	-10.535	74.000	PEAK
6		2500.000	13.629	33.835	47.464	-26.536	74.000	PEAK

Note:

1. All Readings below 1GHz are Peak, above are performed with peak and/or average measurements as necessary.
2. “ * ”, means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.
4. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Site : DEKRA Taiwan CB2-H	Time : 2017/11/29
Limit : FCC_SpartC_15.209_03M_AV	Margin : 6
Probe : CB2_FCC_EFS_B091_1-18GHz_3M_0117 - HORIZONTAL	Power : DC 5V
EUT : Analog GPS Speedometer	Note : Mode 1: Transmitter_Power by PC_2480MHz

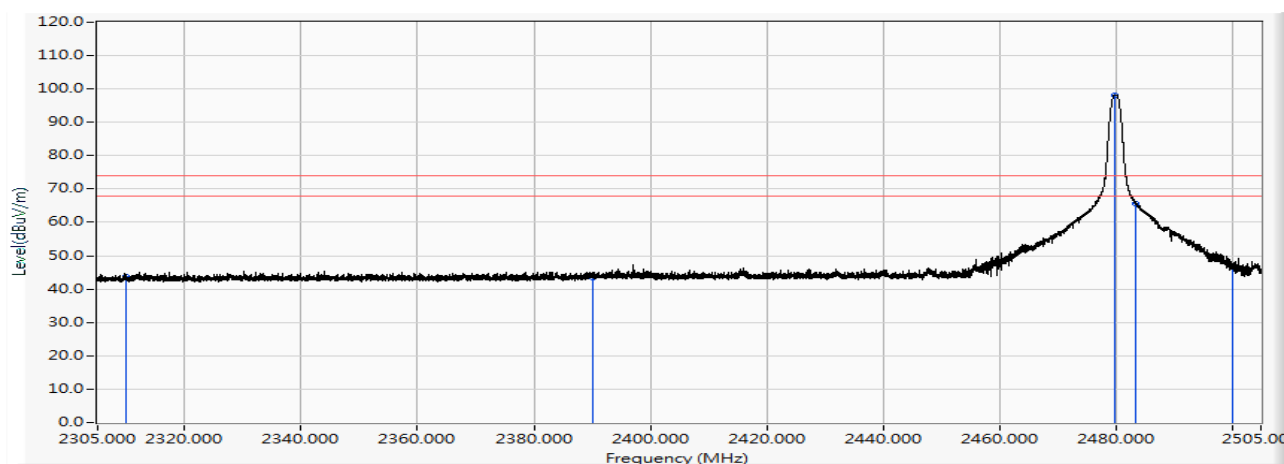


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		2483.500	13.527	22.163	35.690	-18.310	54.000	AVERAGE
2	*	2483.520	13.527	22.190	35.717	-18.283	54.000	AVERAGE

Note:

1. All Readings below 1GHz are Peak, above are performed with peak and/or average measurements as necessary.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.
4. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Site : DEKRA Taiwan CB2-H	Time : 2017/11/29
Limit : FCC_SpartC_15.209_03M_PK	Margin : 6
Probe : CB2_FCC_EFS_B091_1-18GHz_3M_0117 - VERTICAL	Power : DC 5V
EUT : Analog GPS Speedometer	Note : Mode 1: Transmitter_Power by PC_2480MHz

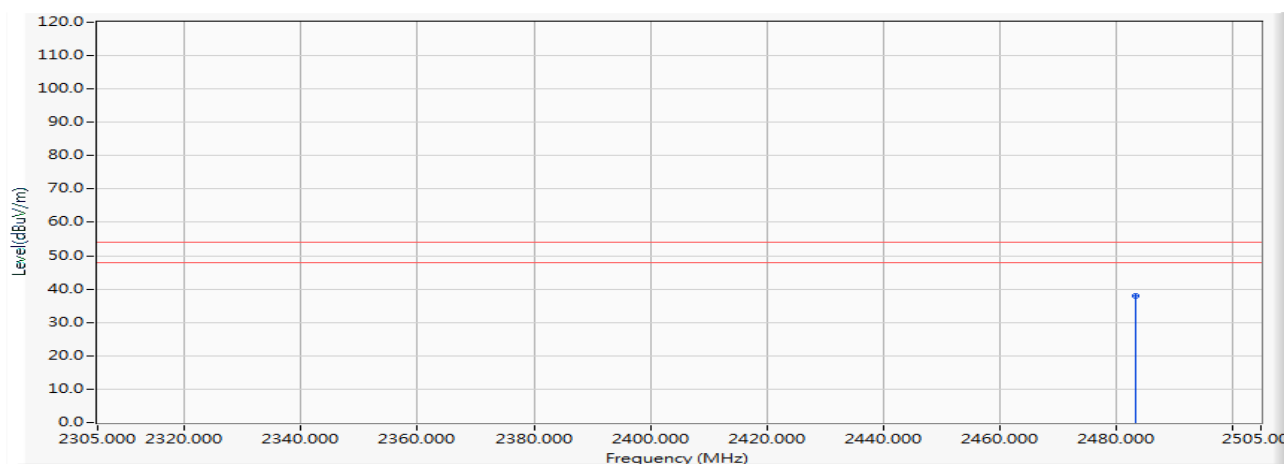


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		2310.000	12.384	31.315	43.699	-30.301	74.000	PEAK
2		2390.000	12.911	30.510	43.421	-30.579	74.000	PEAK
3	*	2479.980	13.504	84.680	98.184	24.184	74.000	PEAK
4		2483.500	13.527	52.122	65.649	-8.351	74.000	PEAK
5		2483.560	13.527	52.153	65.681	-8.319	74.000	PEAK
6		2500.000	13.629	33.004	46.633	-27.367	74.000	PEAK

Note:

1. All Readings below 1GHz are Peak, above are performed with peak and/or average measurements as necessary.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.
4. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Site : DEKRA Taiwan CB2-H	Time : 2017/11/29
Limit : FCC_SpartC_15.209_03M_AV	Margin : 6
Probe : CB2_FCC_EFS_B091_1-18GHz_3M_0117 - VERTICAL	Power : DC 5V
EUT : Analog GPS Speedometer	Note : Mode 1: Transmitter_Power by PC_2480MHz



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		2483.500	13.527	24.374	37.901	-16.099	54.000	AVERAGE
2	*	2483.560	13.527	24.405	37.933	-16.067	54.000	AVERAGE

Note:

1. All Readings below 1GHz are Peak, above are performed with peak and/or average measurements as necessary.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.
4. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

7. DTS Bandwidth

7.1. Test Equipment

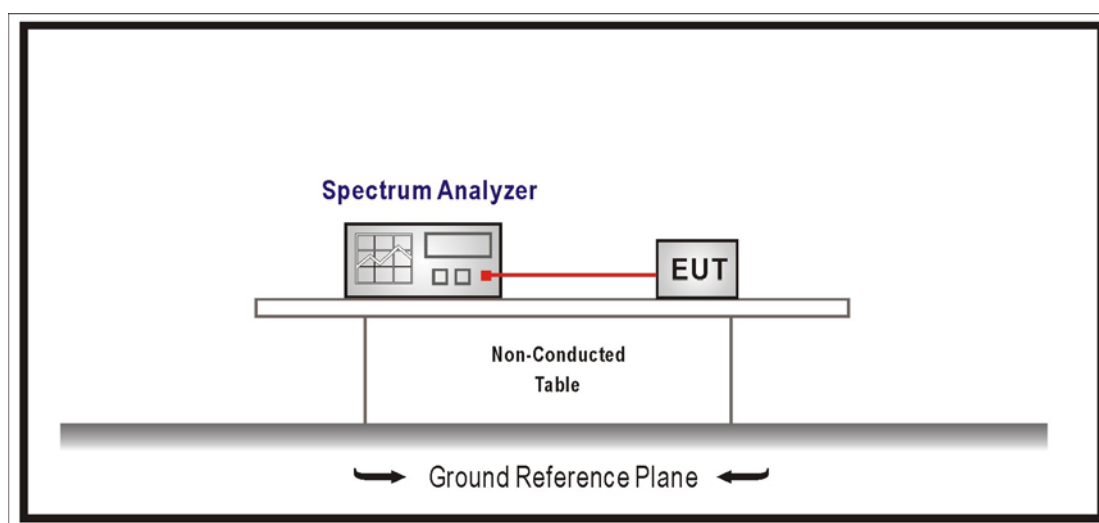
The following test equipments are used during the test:

DTS Bandwidth / SR10-H

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
EXA Signal Analyzer	Keysight	N9010A	MY51440132	2017/03/13	2018/03/12
Spectrum Analyzer	Agilent	N9010A	US47140172	2017/07/26	2018/07/25

Note: All equipments that need to calibrate are with calibration period of 1 year.

7.2. Test Setup



7.3. Test Procedures

The EUT was setup according to ANSI C63.10:2013; tested procedure section 8.1 of KDB558074 D01 V04 for compliance to FCC 47CFR 15.247 requirements. Set RBW = 100KHz, Set the VBW $\geq 3 \times$ RBW, Sweep Time=Auto, Set Peak Detector.

7.4. Limits

The 6 dB bandwidth must be greater than 500 kHz.

7.5. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.247: 2016

7.6. Uncertainty

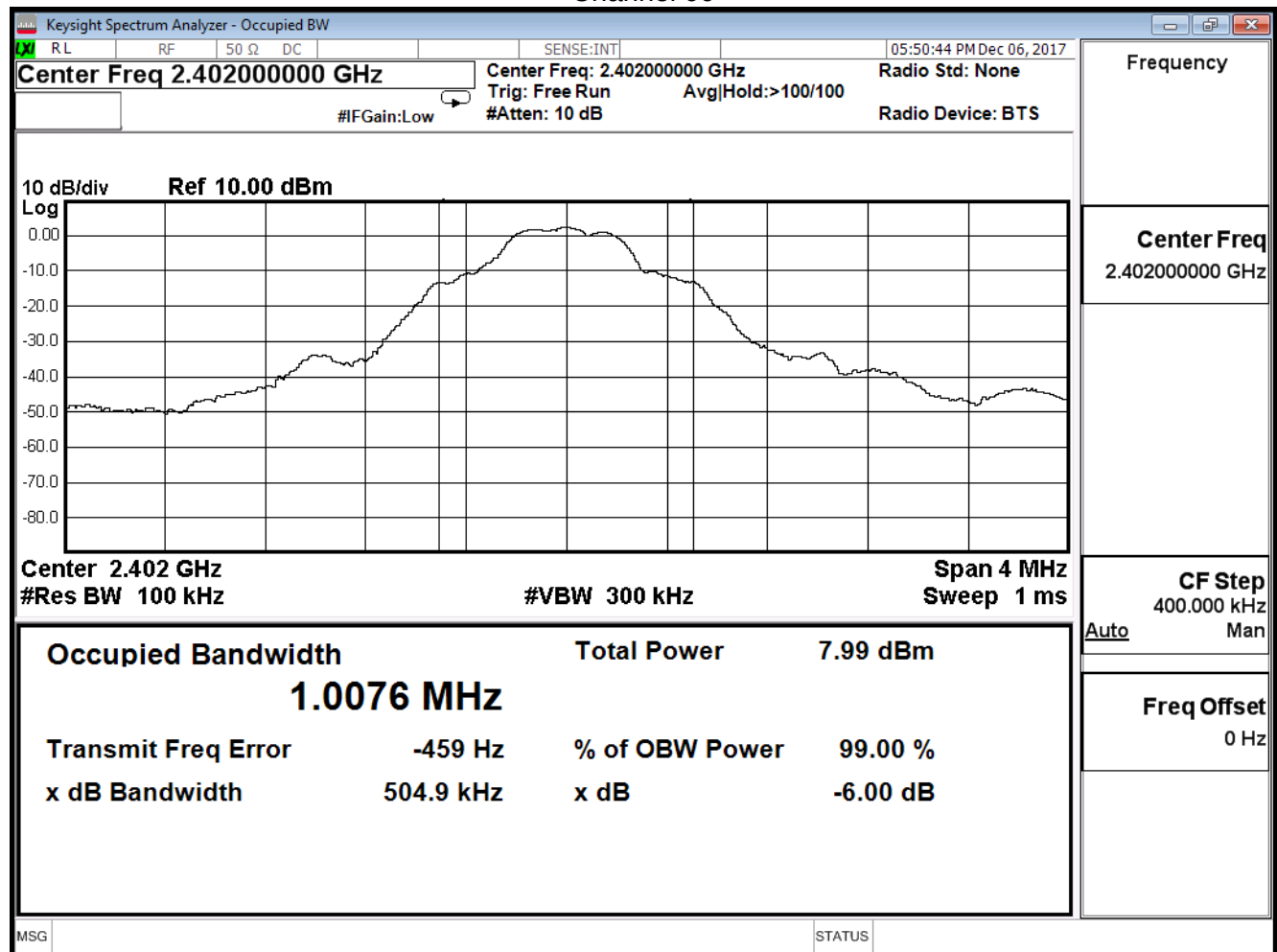
The measurement uncertainty is defined as $\pm 150\text{Hz}$

7.7. Test Result

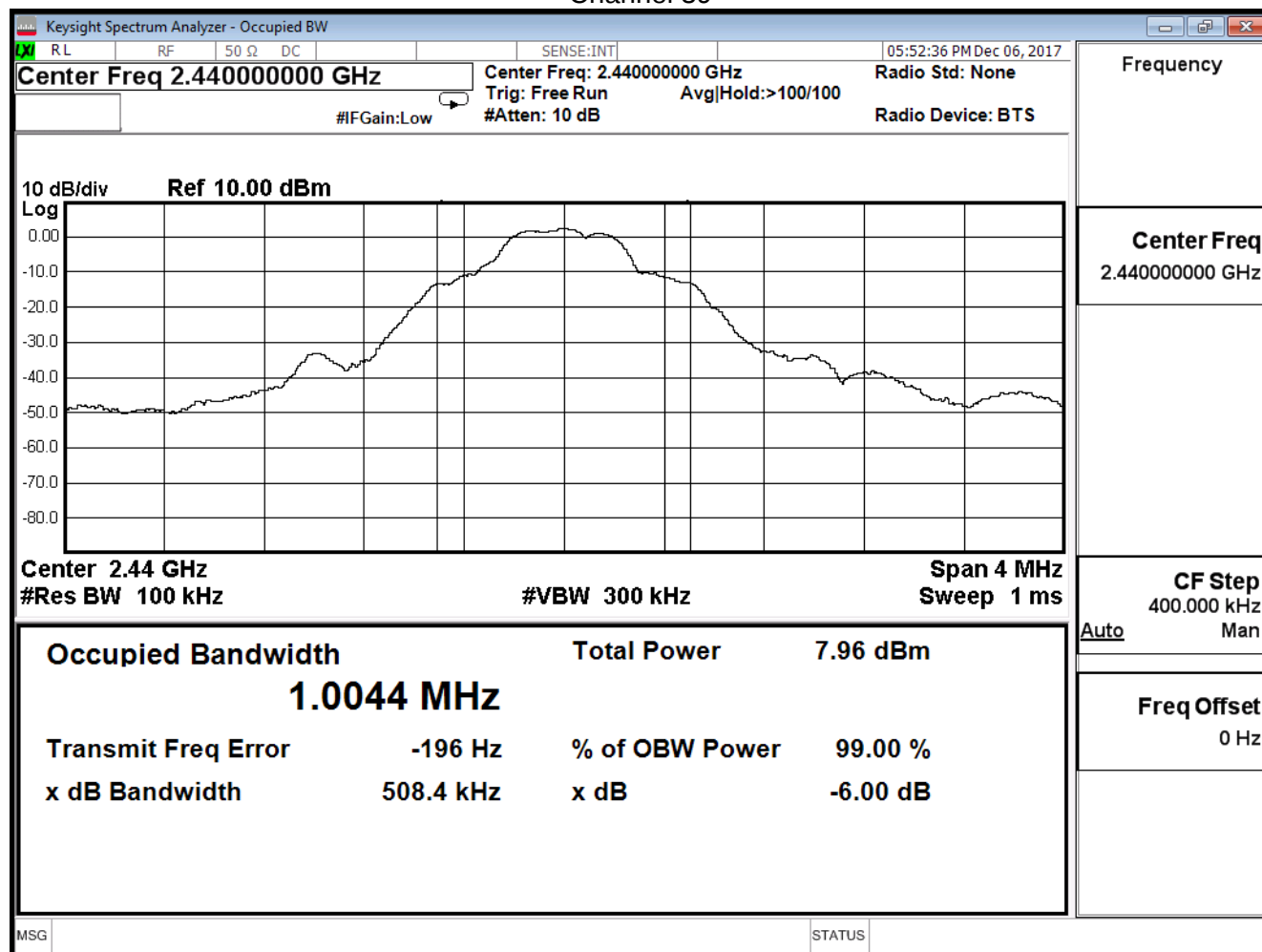
Product	Analog GPS Speedometer		
Test Item	DTS Bandwidth		
Test Mode	Mode 1: Transmitter Power by PC		
Date of Test	2017/12/06	Test Site	SR10-H

Channel No.	Frequency (MHz)	Measure Level (KHz)	Limit (KHz)	Result
00	2402	504.900	≥ 500	Pass
39	2441	508.400	≥ 500	Pass
78	2480	507.400	≥ 500	Pass

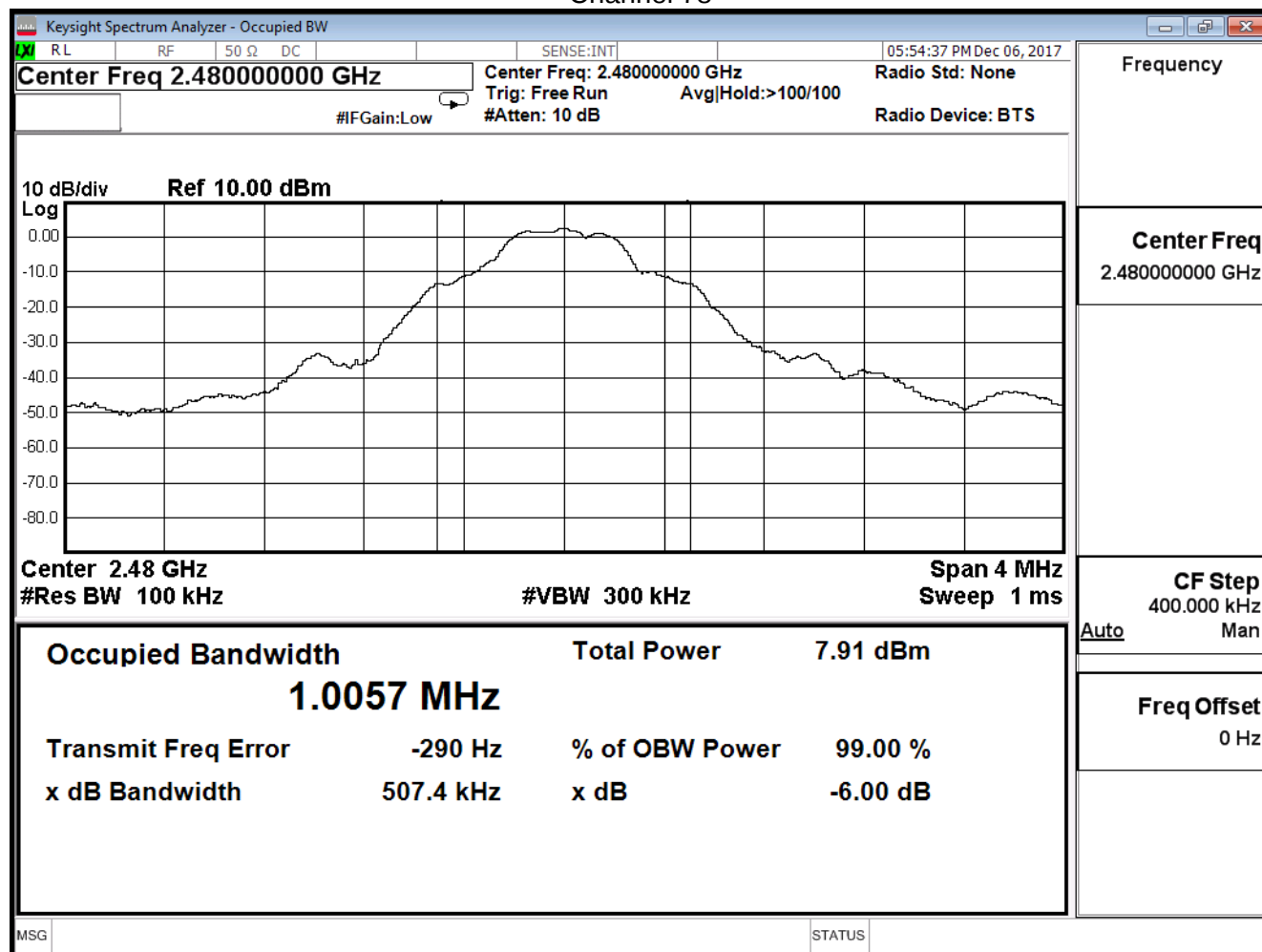
Channel 00



Channel 39



Channel 78



8. Occupied Bandwidth

8.1. Test Equipment

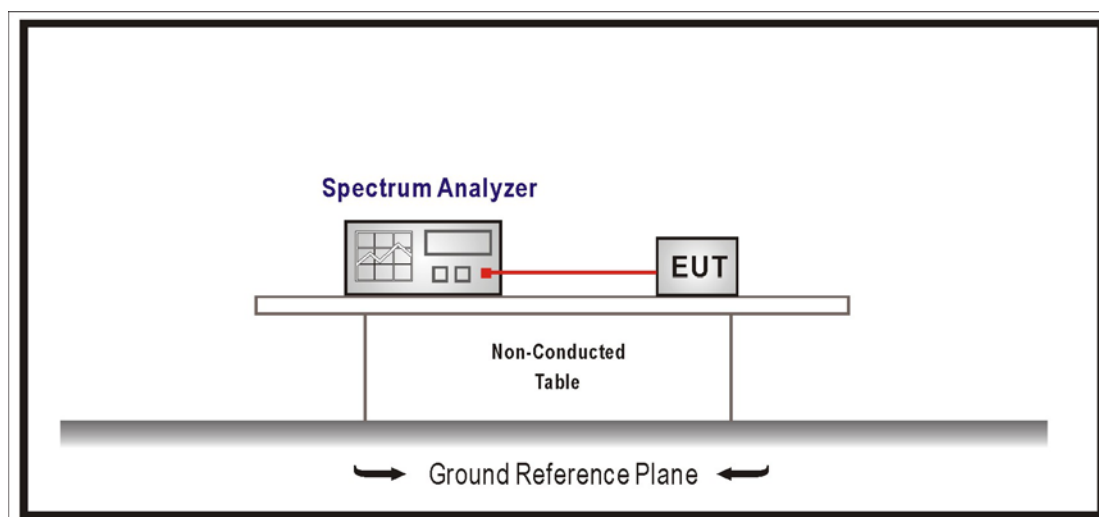
The following test equipments are used during the test:

Occupied Bandwidth / SR10-H

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
EXA Signal Analyzer	Keysight	N9010A	MY51440132	2017/03/13	2018/03/12
Spectrum Analyzer	Agilent	N9010A	US47140172	2017/07/26	2018/07/25

Note: All equipments that need to calibrate are with calibration period of 1 year.

8.2. Test Setup



8.3. Test Procedures

The EUT was setup according to ANSI C63.10:2013; tested according to DTS test procedure of KDB558074 D01 V04 for compliance to FCC 47CFR 15.247 requirements.

Set RBW = 1-5% of the OBW, Set the VBW $\geq 3 \times$ RBW, Sweep Time=Auto.

8.4. Limits

NA

8.5. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.247: 2016

8.6. Uncertainty

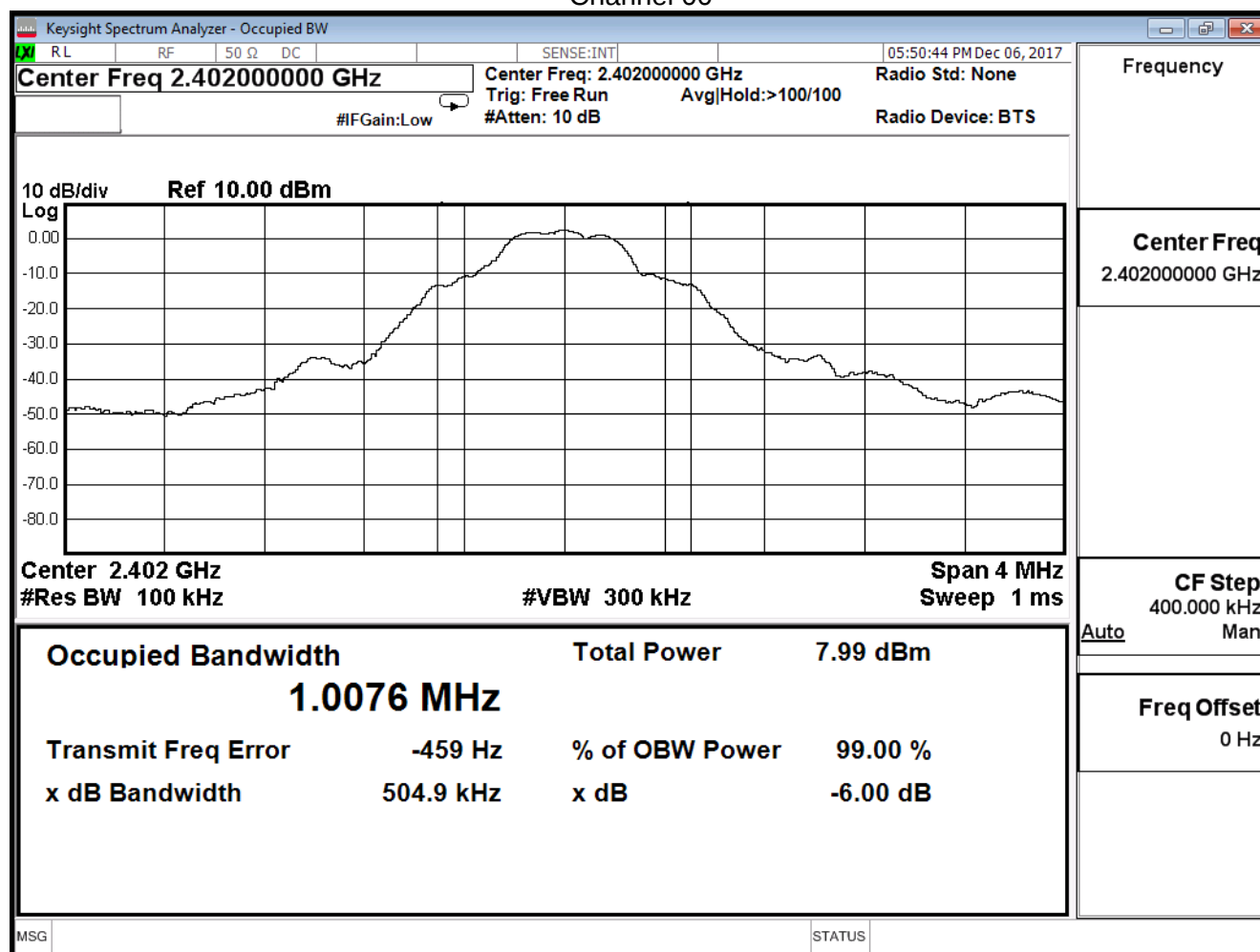
The measurement uncertainty is defined as $\pm 150\text{Hz}$

8.7. Test Result

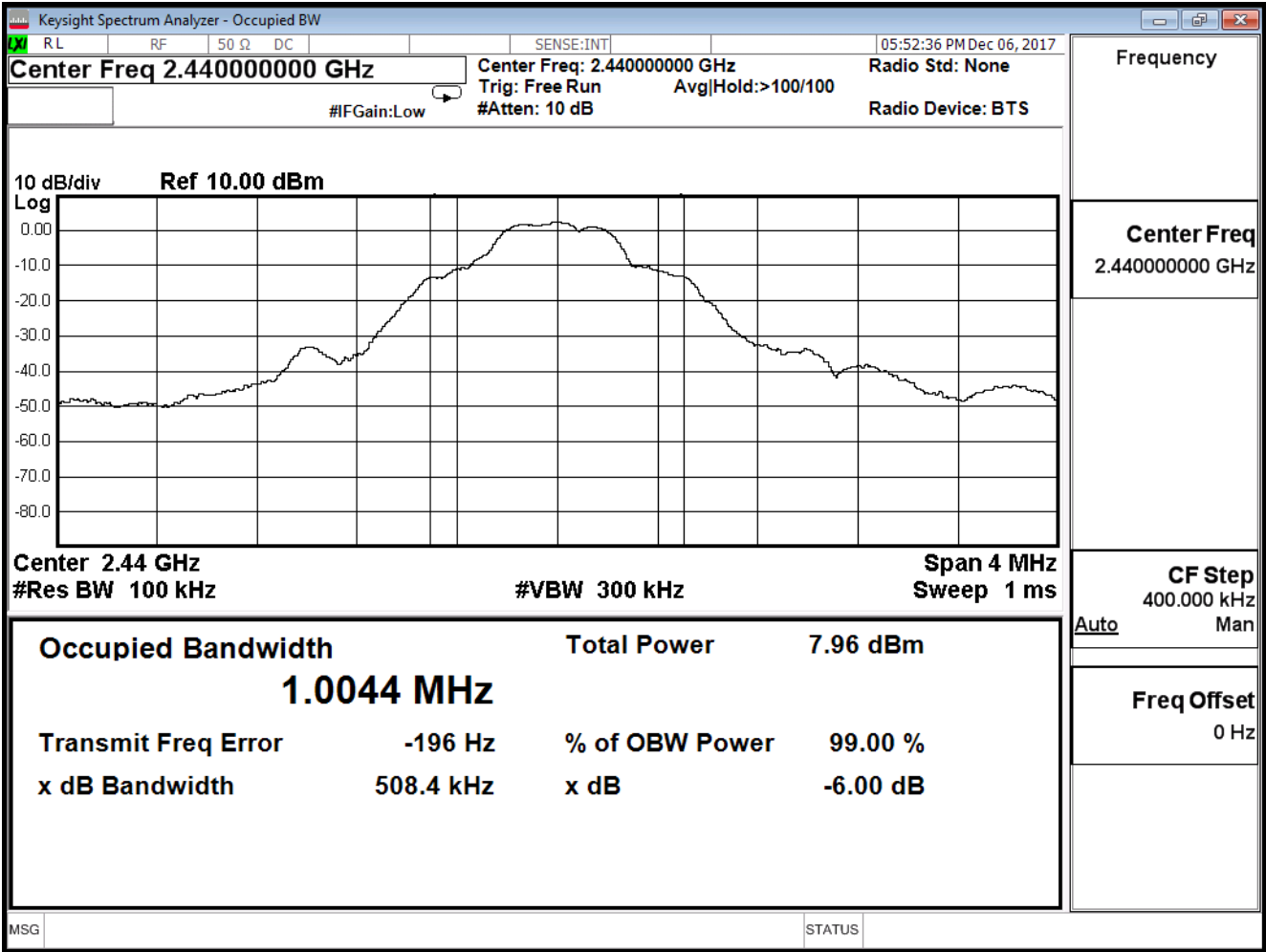
Product	Analog GPS Speedometer		
Test Item	Occupied Bandwidth		
Test Mode	Mode 1: Transmitter Power by PC		
Date of Test	2017/12/06	Test Site	SR10-H

Channel No.	Frequency (MHz)	Measure Level(MHz)	Limit (MHz)	Result
00	2402	1.007	--	Pass
39	2441	1.004	--	Pass
78	2480	1.005	--	Pass

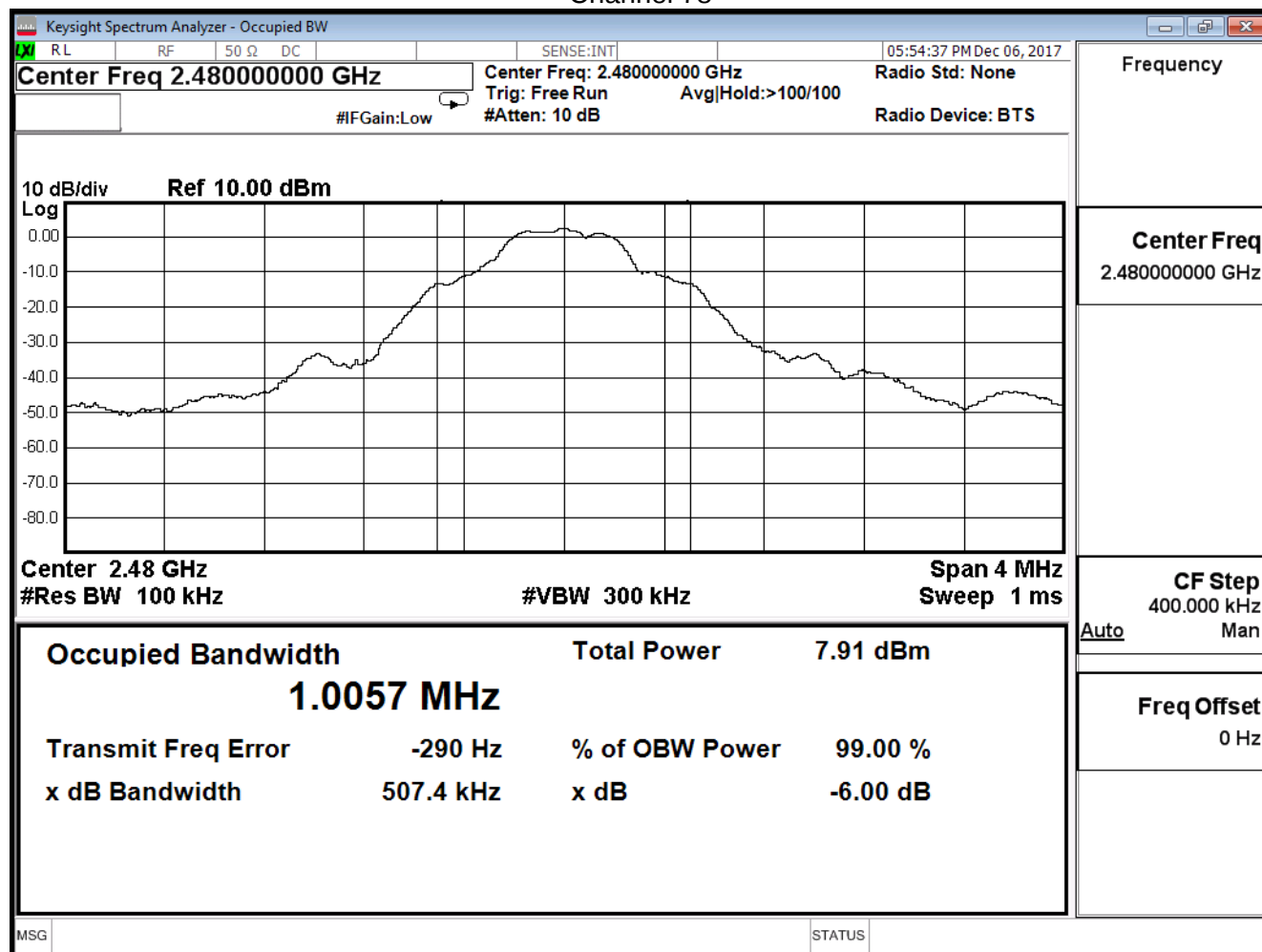
Channel 00



Channel 39



Channel 78



9. Power Density

9.1. Test Equipment

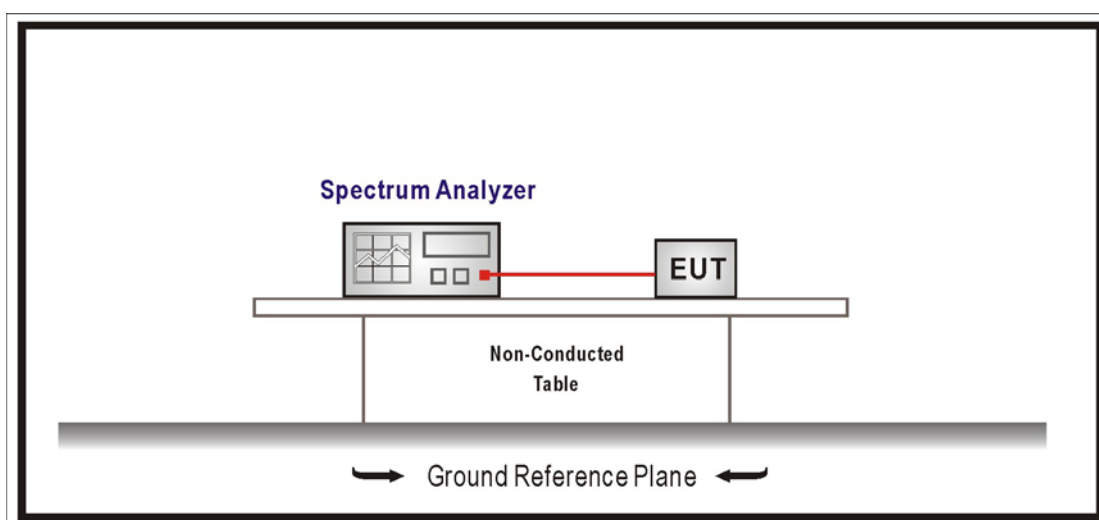
The following test equipment is used during the test:

Power Density / SR10-H

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
Signal & Spectrum Analyzer	R&S	FSV40	101049	2017/01/23	2018/01/22
EXA Signal Analyzer	Keysight	N9010A	MY51440132	2017/03/13	2018/03/12

Note: All equipments that need to calibrate are with calibration period of 1 year.

9.2. Test Setup



9.3. Limits

The peak power spectral density conducted from the intentional radiated to the antenna shall not be greater than +8dBm in any 3kHz band during any time interval of continuous transmission.

9.4. Test Procedures

The EUT was setup according to ANSI C63.10: 2013; tested according to DTS test procedure section 10.2 of KDB558074 D01 V04 for compliance to FCC 47CFR 15.247 requirements. Set 3KHz $\leq$ RBW $\leq$ 100 kHz, Set VBW $\geq$ 3xRBW, Sweep time=Auto, Set Peak detector.

9.5. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.247: 2016

9.6. Uncertainty

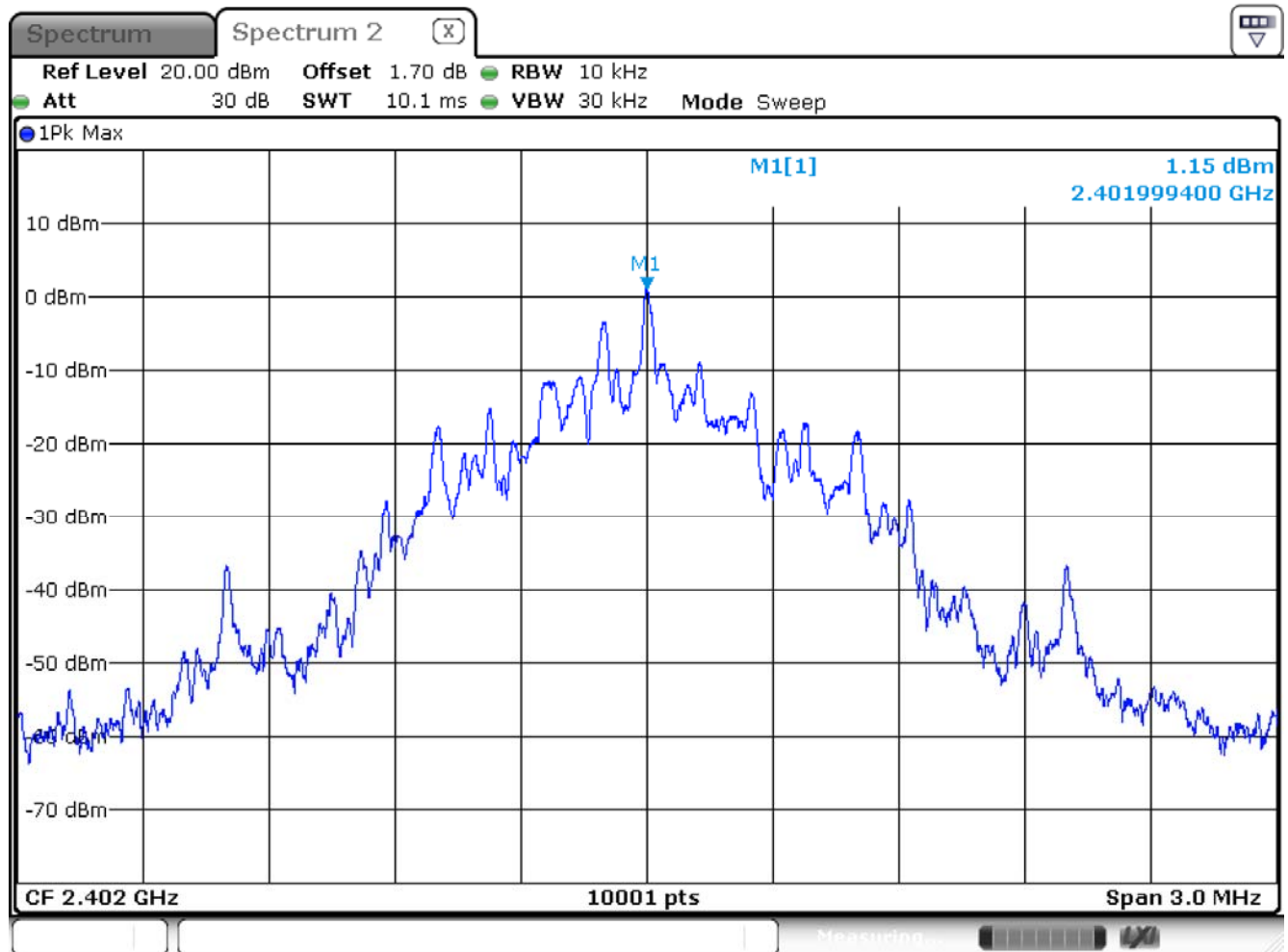
The measurement uncertainty is defined as ± 1.27 dB.

9.7. Test Result

Product	Analog GPS Speedometer		
Test Item	Power Density		
Test Mode	Mode 1: Transmitter_Power by PC		
Date of Test	2017/12/04	Test Site	SR10-H

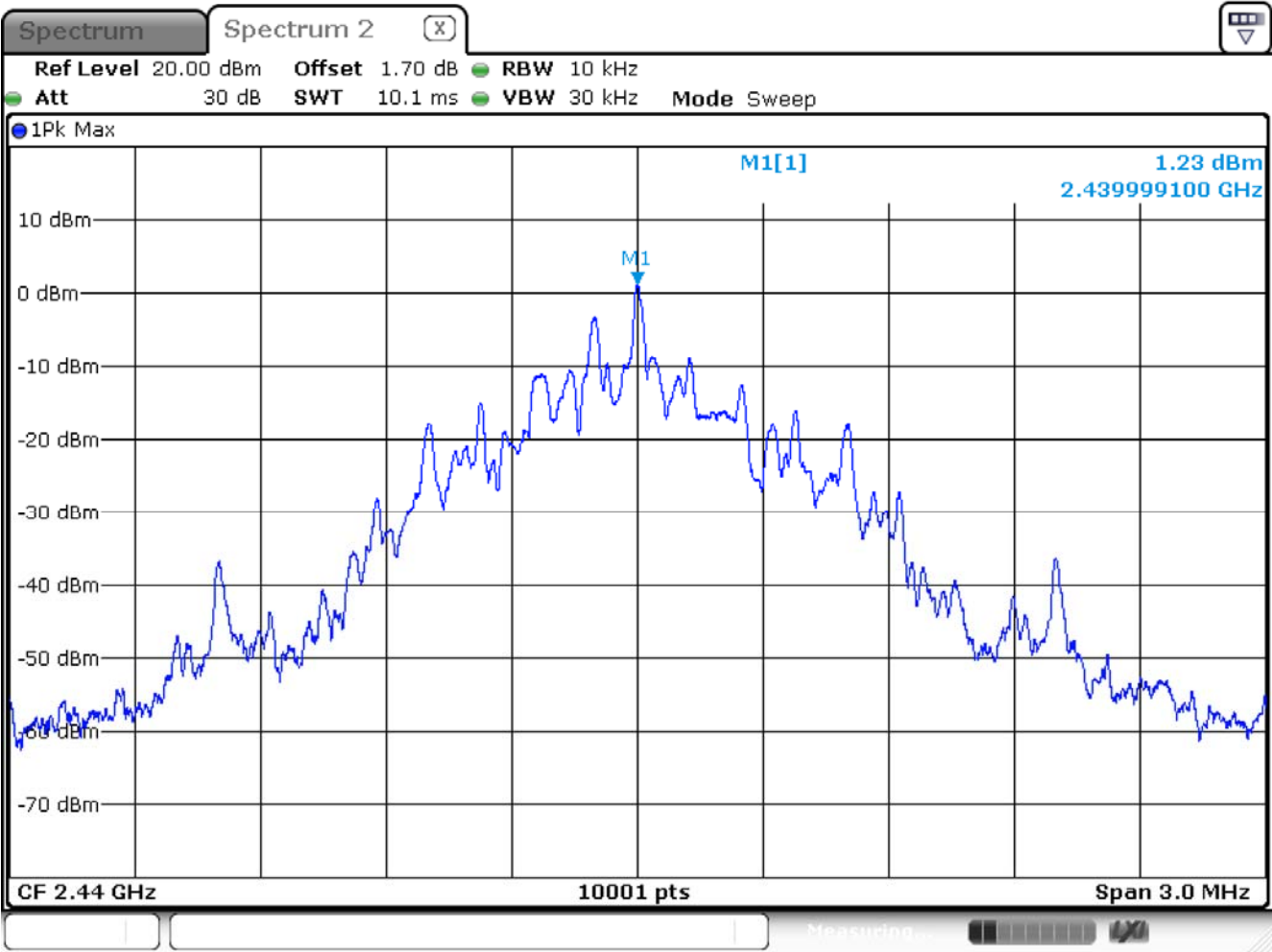
Channel No.	Frequency (MHz)	Measure Level (dBm/3kHz)	Limit (dBm/3kHz)	Result
00	2402	1.150	≤ 8.000	Pass
39	2441	1.230	≤ 8.000	Pass
78	2480	1.260	≤ 8.000	Pass

Channel 00



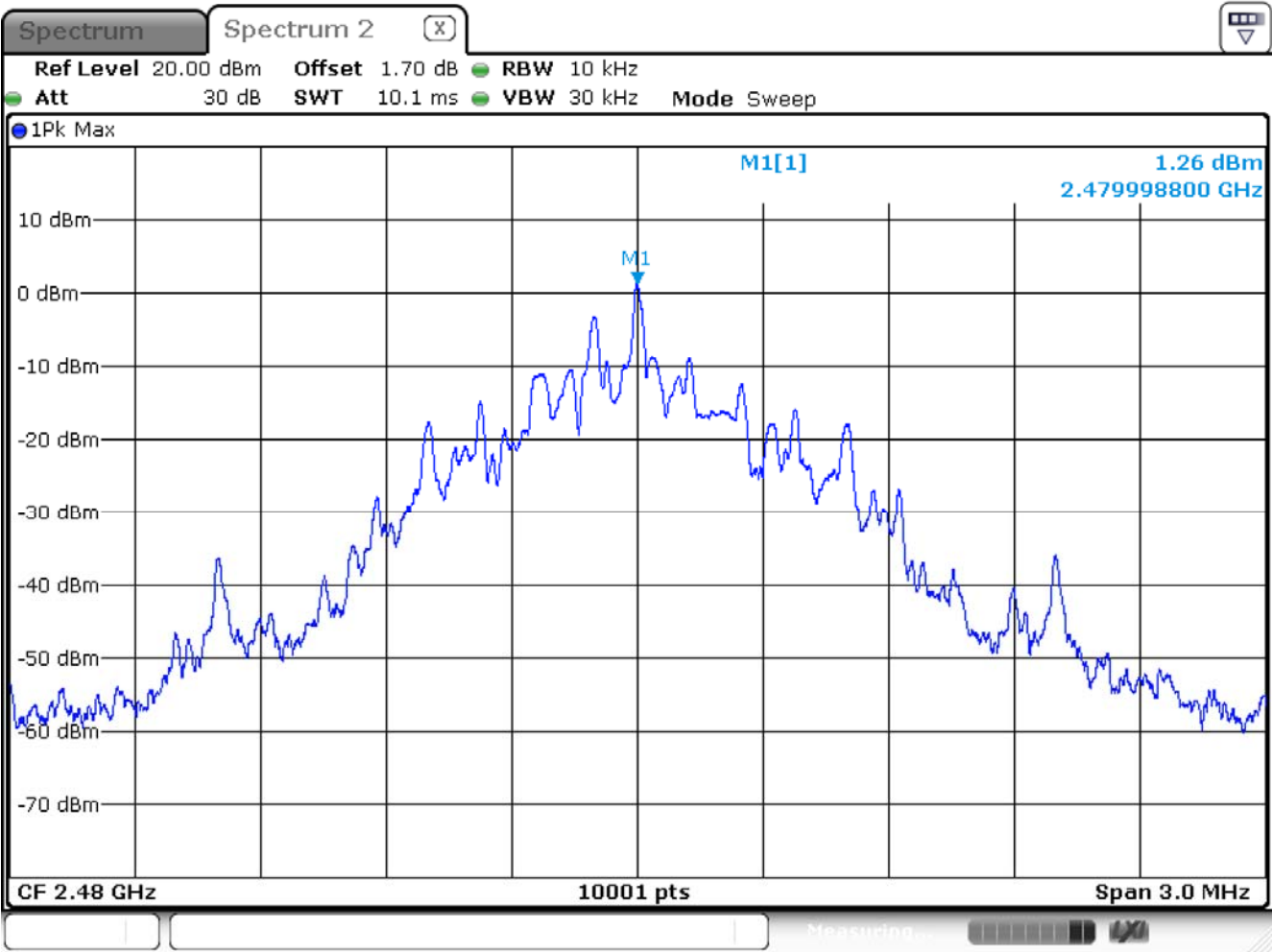
Date: 4.DEC.2017 10:37:40

Channel 39



Date: 4.DEC.2017 10:46:10

Channel 78



Date: 4.DEC.2017 11:32:15

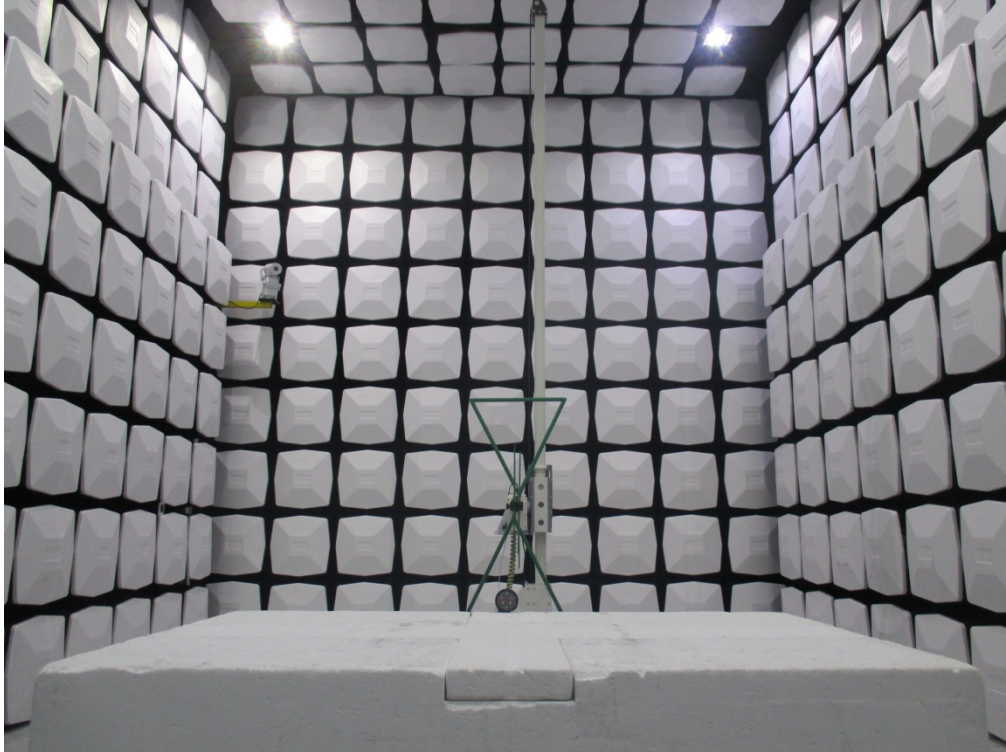
Attachment 1

➤ Test Setup Photograph

<Radiated Emission>

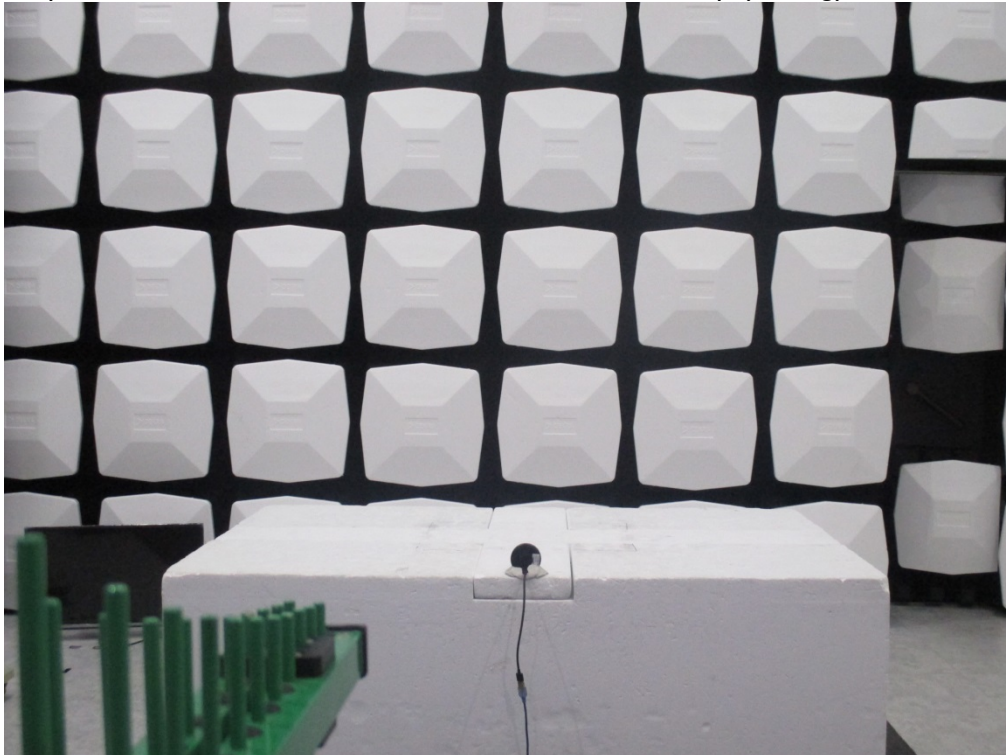
Test Mode : Mode 1: Transmitter_Power by PC

Description : Front View of Radiated Emission Test Setup (Bi-Log)



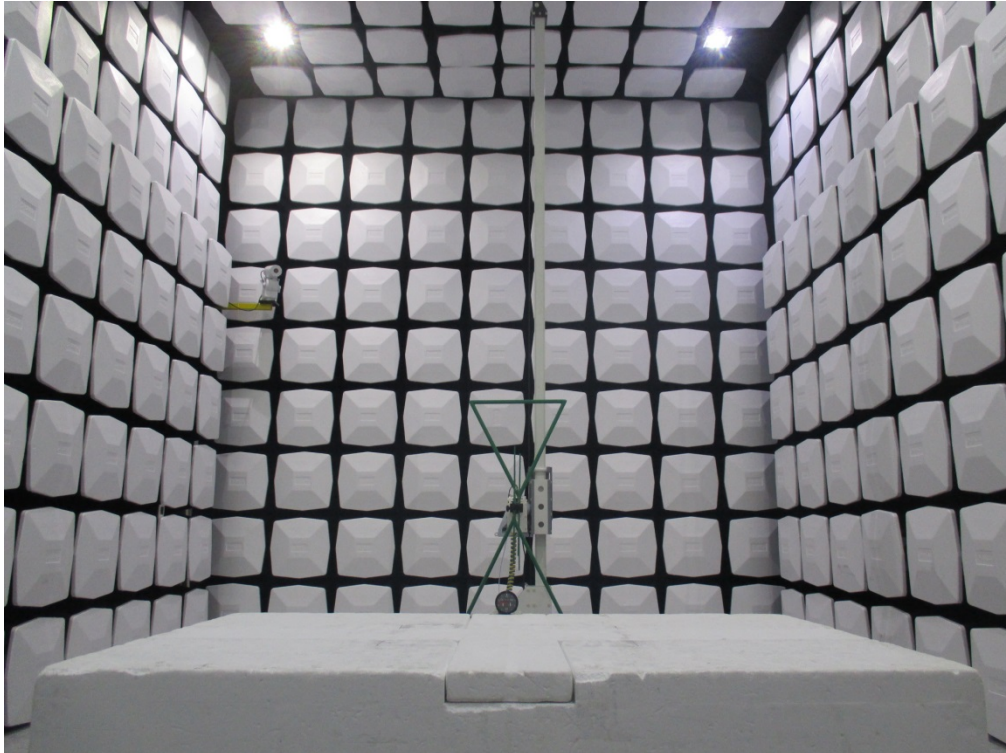
Test Mode : Mode 1: Transmitter_Power by PC

Description : Back View of Radiated Emission Test Setup (Bi-Log)



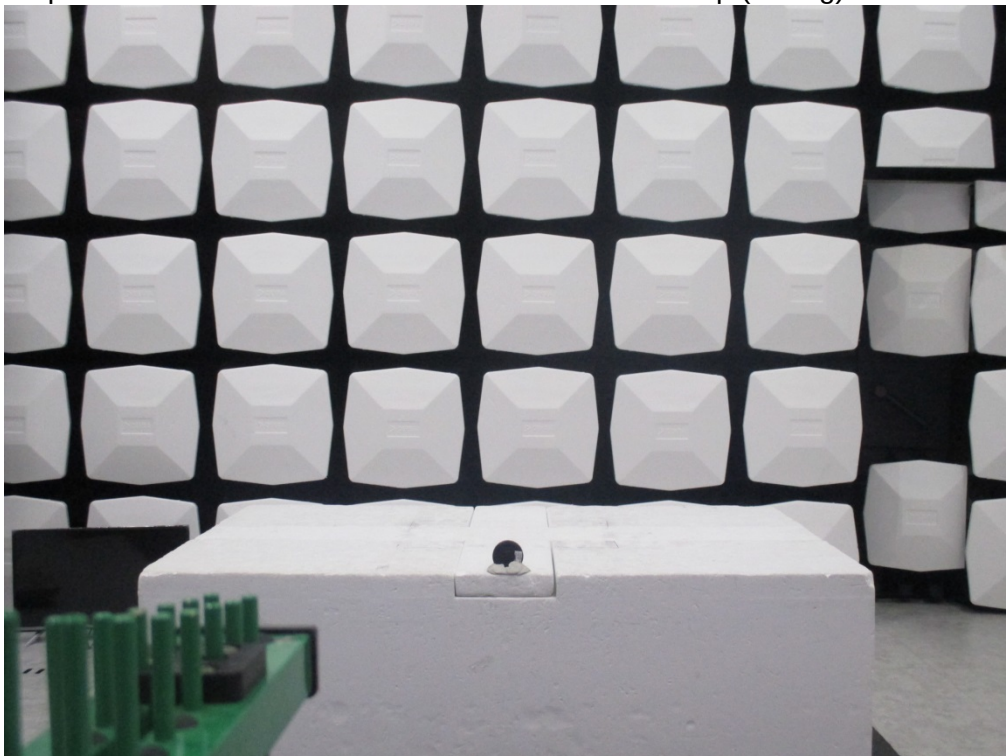
Test Mode : Mode 2: Transmitter_Power by Battery

Description : Front View of Radiated Emission Test Setup (Bi-Log)



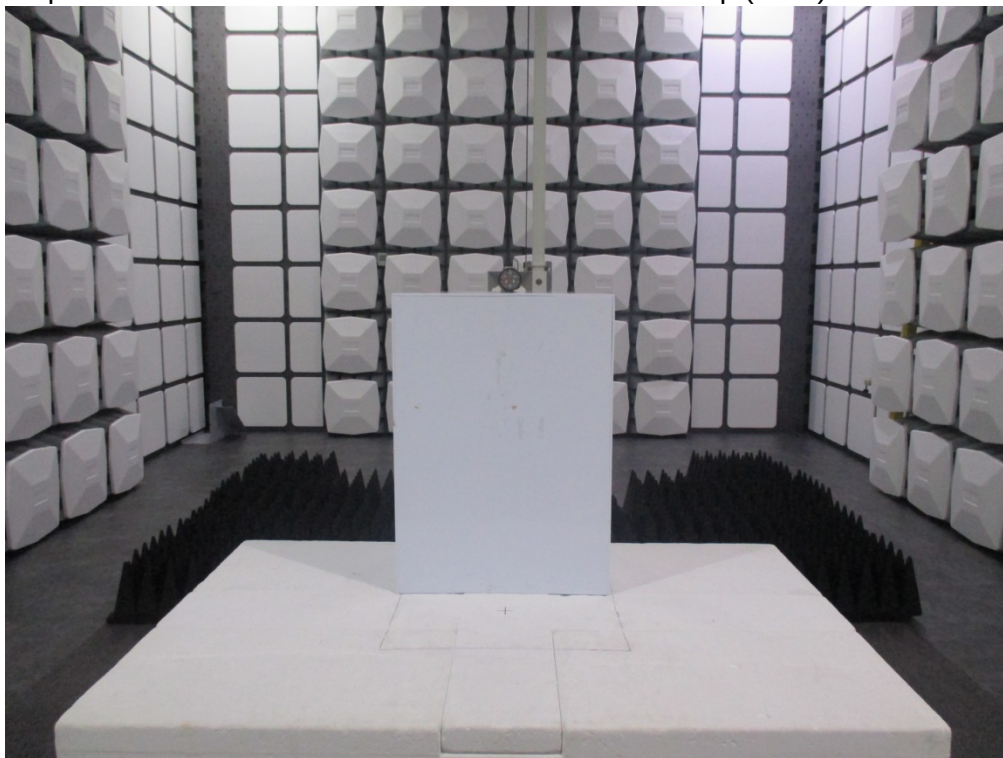
Test Mode : Mode 2: Transmitter_Power by Battery

Description : Back View of Radiated Emission Test Setup (Bi-Log)



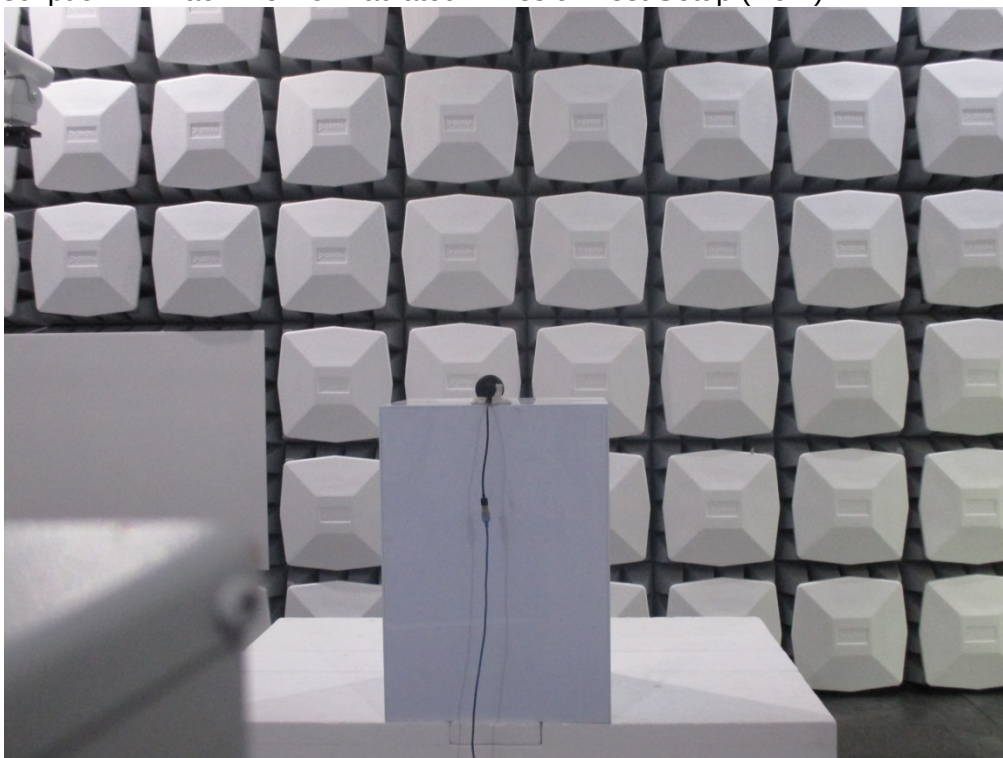
Test Mode : Mode 1: Transmitter_Power by PC

Description : Front View of Radiated Emission Test Setup (Horn)



Test Mode : Mode 1: Transmitter_Power by PC

Description : Back View of Radiated Emission Test Setup (Horn)



Attachment 2

➤ EUT External Photograph

(1) EUT Photo



(2) EUT Photo



(3) EUT Photo



(4) EUT Photo



(5) EUT Photo



(6) EUT Photo



(7) EUT Photo



(8) EUT Photo



(9) EUT Photo



Attachment 3

➤ EUT Internal Photograph

(1) EUT Photo



(2) EUT Photo



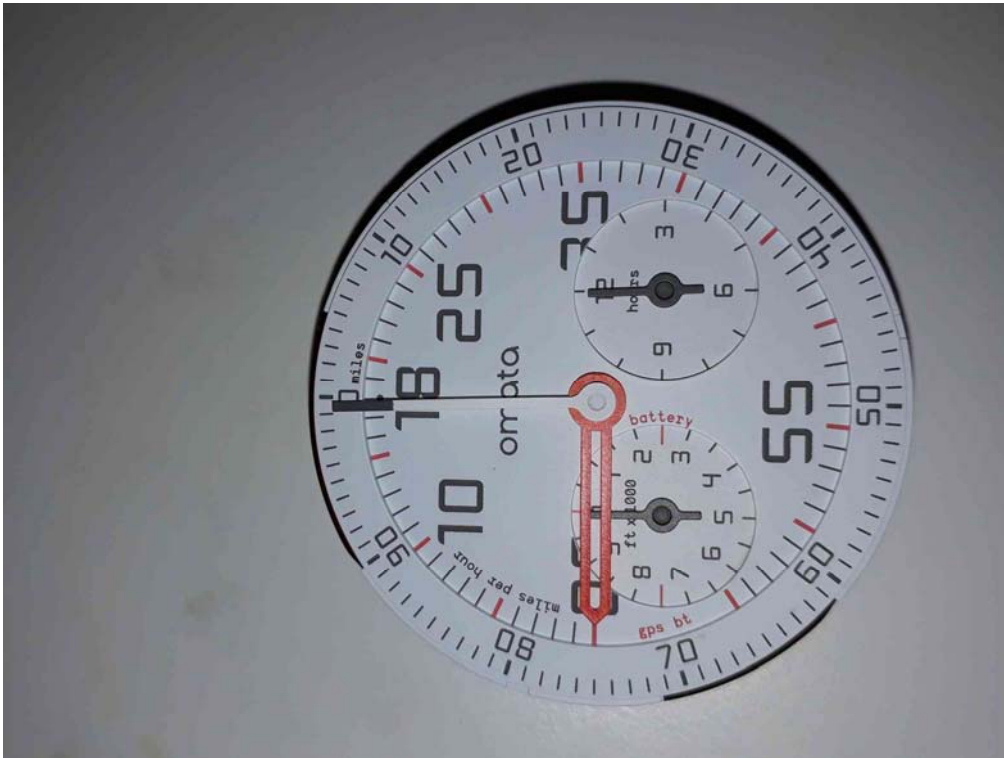
(3) EUT Photo



(4) EUT Photo



(5) EUT Photo



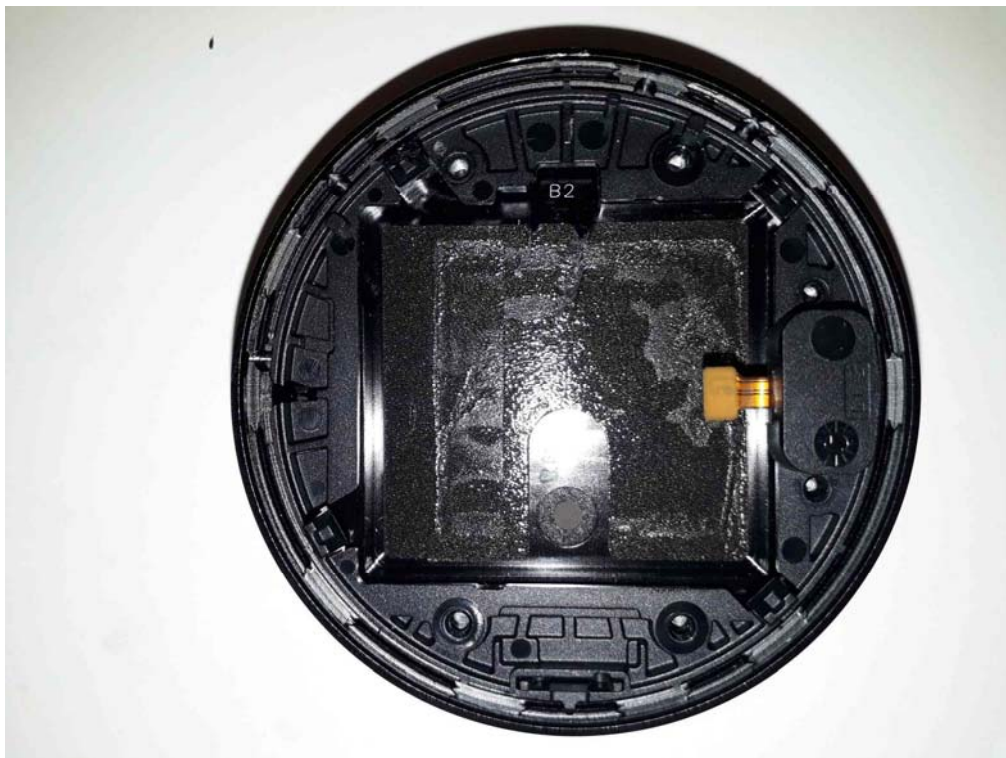
(6) EUT Photo



(7) EUT Photo



(8) EUT Photo



(9) EUT Photo



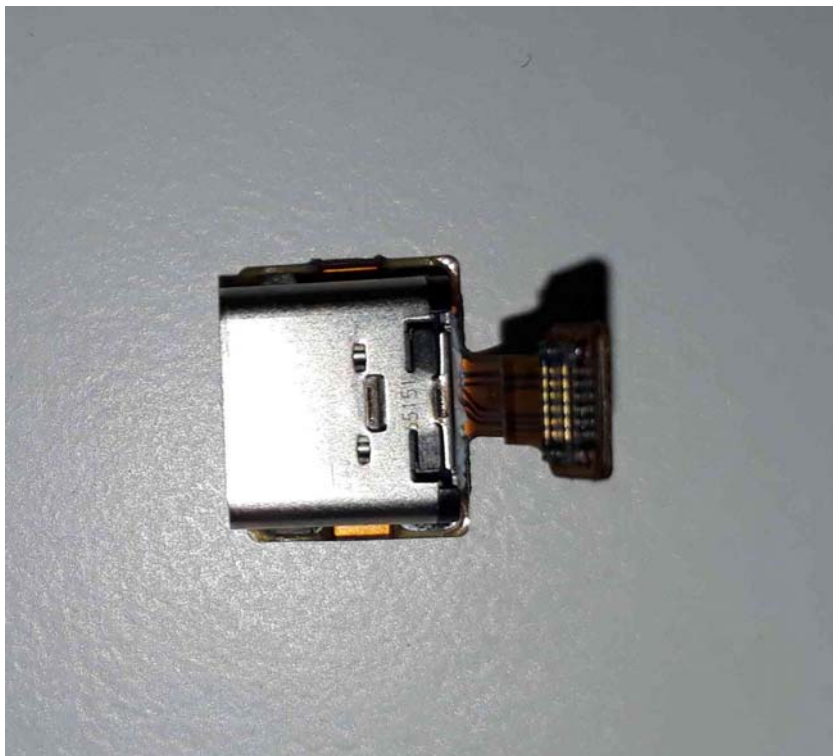
(10) EUT Photo



(11) EUT Photo



(12) EUT Photo



(13) EUT Photo (Bezel_front)



(14) EUT Photo (Bezel_back)

