

TEST REPORT

Reference No..... : WTX22X05097350W001
FCC ID : 2A6VH-OY1211
Applicant : Talkpool AB
Address..... : Ostergatan 11, SE-434 30 Kungsbacka, Sweden
Manufacturer : The same as Applicant
Address..... : The same as Applicant
Product Name : CO2 meter
Model No..... : OY1211
Standards : FCC Part 15.247
Date of Receipt sample : 2022-05-18
Date of Test..... : 2022-05-18 to 2022-09-29
Date of Issue : 2022-09-29
Test Report Form No. : WTX_Part 15_247W
Test Result..... : Pass

Remarks:

The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of approver.

Prepared By:

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Report version

Version No.	Date of issue	Description
Rev.00	2022-09-29	Original
/	/	/

1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

General Description of EUT	
Product Name:	CO2 meter
Trade Name	/
Model No.:	OY1211
Adding Model(s):	/
Rated Voltage:	DC 3.6V
Battery Capacity	/
Power Adapter:	/
Note: The test data is gathered from a production sample, provided by the manufacturer.	

Technical Characteristics of EUT	
Frequency Range:	903MHz-914.2MHz
RF Output Power:	0.0021mW (Conducted)
Modulation:	LoRa
Quantity of Channels:	8
Channel Separation:	600kHz
Type of Antenna:	PCB Antenna
Antenna Gain:	-0.53dBi

1.2 Test Standards

The tests were performed according to following standards:

FCC Rules Part 15.247: Frequency Hopping, Direct Spread Spectrum and Hybrid Systems that are in operation within the bands of 902-928MHz, 2400-2483.5MHz, and 5725-5850MHz.

558074 D01 15.247 Meas Guidance v05r02: Guidance for Compliance Measurements on Digital Transmission System, Frequency Hopping Spread Spectrum System, and Hybrid System Devices Operating under section 15.247 of the Fcc rules.

ANSI C63.10-2013: American National Standard for Testing Unlicensed Wireless Devices.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product, which result in lowering the emission, should be checked to ensure compliance has been maintained.

1.3 Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2013, KDB 558074 D01 15.247 Meas Guidance v05r02.

The equipment under test (EUT) was configured to measure its highest possible emission level. The test modes were adapted accordingly in reference to the Operating Instructions.

1.4 Test Facility

Address of the test laboratory

Laboratory: Waltek Testing Group (Shenzhen) Co., Ltd.

Address: 1/F., Room 101, Building 1, Hongwei Industrial Park, Liuxian 2nd Road, Block 70 Bao'an District, Shenzhen, Guangdong, China

FCC – Registration No.: 125990

Waltek Testing Group (Shenzhen) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files. The Designation Number is CN5010, and Test Firm Registration Number is 125990.

Industry Canada (IC) Registration No.: 11464A

The 3m Semi-anechoic chamber of Waltek Testing Group (Shenzhen) Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 11464A.

1.5 EUT Setup and Test Mode

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements. All testing shall be performed under maximum output power condition, with a duty cycle equal to 100%, and to measure its highest possible emissions level, more detailed description as follows:

Test Mode List		
Test Mode	Description	Remark
TM1	Low Channel	903.0MHz
TM2	Middle Channel	909.4MHz
TM3	High Channel	914.2 MHz

Test Conditions	
Temperature:	22~25 °C
Relative Humidity:	45~55 %
ATM Pressure:	1019 mbar

EUT Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
/	/	/	/

Special Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
USB Cable	1.82	Shielded	Without Ferrite

Auxiliary Equipment List and Details			
Description	Manufacturer	Model	Serial Number
Notebook	Lenovo	TP00114A	R9-0YPT2W

1.6 Measurement Uncertainty

Measurement uncertainty		
Parameter	Conditions	Uncertainty
RF Output Power	Conducted	$\pm 0.42\text{dB}$
Occupied Bandwidth	Conducted	$\pm 1.5\%$
Power Spectral Density	Conducted	$\pm 1.8\text{dB}$
Conducted Spurious Emission	Conducted	$\pm 2.17\text{dB}$
Conducted Emissions	Conducted	9-150kHz $\pm 3.74\text{dB}$
		0.15-30MHz $\pm 3.34\text{dB}$
Transmitter Spurious Emissions	Radiated	30-200MHz $\pm 4.52\text{dB}$
		0.2-1GHz $\pm 5.56\text{dB}$
		1-6GHz $\pm 3.84\text{dB}$
		6-18GHz $\pm 3.92\text{dB}$

1.7 Test Equipment List and Details

No.	Description	Manufacturer	Model	Serial No.	Cal Date	Due. Date
SEMT-107 5	Communication Tester	Rohde & Schwarz	CMW500	148650	2022-03-22	2023-03-21
SEMT-106 3	GSM Tester	Rohde & Schwarz	CMU200	114403	2022-03-22	2023-03-21
SEMT-107 2	Spectrum Analyzer	Agilent	E4407B	MY41440400	2022-03-25	2023-03-24
SEMT-107 9	Spectrum Analyzer	Agilent	N9020A	US47140102	2022-03-22	2023-03-21
SEMT-131 3	Spectrum Analyzer	Agilent	N9020A	MY54320548	2022-03-22	2023-03-21
SEMT-108 0	Signal Generator	Agilent	83752A	3610A01453	2022-03-22	2023-03-21
SEMT-108 1	Vector Signal Generator	Agilent	N5182A	MY47070202	2022-03-22	2023-03-21
SEMT-102 8	Power Divider	Weinschel	1506A	PM204	2022-03-22	2023-03-21
SEMT-C00 1	Cable	Zheng DI	LL142-07-07-10M(A)	/	/	/
SEMT-C00 2	Cable	Zheng DI	ZT40-2.92J-2.92J-6M	/	/	/
SEMT-C00 3	Cable	Zheng DI	ZT40-2.92J-2.92J-2.5M	/	/	/
SEMT-C00 4	Cable	Zheng DI	2M0RFC	/	/	/
SEMT-C00 5	Cable	Zheng DI	1M0RFC	/	/	/
SEMT-C00 6	Cable	Zheng DI	1M0RFC	/	/	/
☒ Chamber A: Below 1GHz						
SEMT-103 1	Spectrum Analyzer	Rohde & Schwarz	FSP30	836079/035	2022-03-22	2023-03-21
SEMT-100 7	EMI Test Receiver	Rohde & Schwarz	ESVB	825471/005	2022-03-22	2023-03-21
SEMT-100 8	Amplifier	Agilent	8447F	3113A06717	2022-01-07	2023-01-06
SEMT-106 9	Loop Antenna	Schwarz beck	FMZB 1516	9773	2021-03-20	2023-03-19
SEMT-106 8	Broadband Antenna	Schwarz beck	VULB9163	9163-333	2021-03-20	2023-03-19

☒ Chamber A: Above 1GHz						
SEMT-103 1	Spectrum Analyzer	Rohde & Schwarz	FSP30	836079/035	2022-03-2 2	2023-03-2 1
SEMT-100 7	EMI Test Receiver	Rohde & Schwarz	ESVB	825471/005	2022-03-2 2	2023-03-2 1
SEMT-104 3	Amplifier	C&D	PAP-1G18	2002	2022-03-2 2	2023-03-2 1
SEMT-104 2	Horn Antenna	ETS	3117	00086197	2021-03-1 9	2023-03-1 8
SEMT-112 1	Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170 582	2021-04-2 7	2023-04-2 6
SEMT-121 6	Pre-amplifier	Schwarzbeck	BBV 9721	9721-031	2022-03-2 5	2023-03-2 4
SEMT-116 3	Spectrum Analyzer	Rohde & Schwarz	FSP40	100612	2022-03-2 2	2023-03-2 1
☐ Chamber B: Below 1GHz						
SEMT-106 8	Trilog Broadband Antenna	Schwarz beck	VULB9163(B)	9163-635	2021-04-0 9	2023-04-0 8
SEMT-106 7	Amplifier	Agilent	8447D	2944A1017 9	2022-03-2 2	2023-03-2 1
SEMT-106 6	EMI Test Receiver	Rohde & Schwarz	ESPI	101391	2022-03-2 2	2023-03-2 1
☐ Chamber C: Below 1GHz						
SEMT-131 9	EMI Test Receiver	Rohde & Schwarz	ESIB 26	100401	2022-01-0 7	2023-01-0 6
SEMT-134 3	Trilog Broadband Antenna	Schwarz beck	VULB 9168	1194	2021-05-2 8	2023-05-2 7
SEMT-133 3	Amplifier	HP	8447F	2944A0386 9	2022-03-2 2	2023-03-2 1
☒ Conducted Room 1#						
SEMT-100 1	EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2022-03-2 1	2023-03-2 0
SEMT-100 2	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100911	2022-03-2 5	2023-03-2 4
SEMT-100 3	AC LISN	Schwarz beck	NSLK8126	8126-224	2022-03-2 2	2023-03-2 1
☐ Conducted Room 2#						
SEMT-133 4	EMI Test Receiver	Rohde & Schwarz	ESPI	101259	2022-03-2 2	2023-03-2 1
SEMT-133	LISN	Rohde &	ENV 216	100097	2022-03-2	2023-03-2

Reference No.: WTX22X05097350W001

6		Schwarz			2	1
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Software List			
Description	Manufacturer	Model	Version
EMI Test Software (Radiated Emission)*	Farad	EZ-EMC	RA-03A1
EMI Test Software (Conducted Emission)*	Farad	EZ-EMC	RA-03A1

*Remark: indicates software version used in the compliance certification testing.

2. SUMMARY OF TEST RESULTS

FCC Rules	Description of Test Item	Result
§15.203; §15.247(b)(4)(i)	Antenna Requirement	Compliant
§15.205	Restricted Band of Operation	Compliant
§15.207(a)	Conducted Emission	N/A
§15.247(e)	Power Spectral Density	Compliant
§15.247(a)(2)	DTS Bandwidth	Compliant
§15.247(b)(3)	RF Output Power	Compliant
§15.209(a)	Radiated Emission	Compliant
§15.247(d)	Band Edge (Out of Band Emissions)	Compliant

N/A: Not applicable.

3. Antenna Requirement

3.1 Standard Applicable

According to FCC Part 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

3.2 Evaluation Information

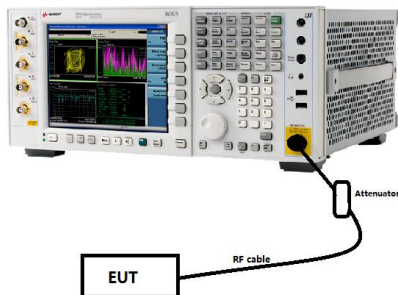
This product has a PCB Antenna, fulfill the requirement of this section.

4. Power Spectral Density

4.1 Standard Applicable

According to 15.247(a)(1)(iii), for digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3kHz band during any time interval of continuous transmission.

4.2 Test Setup Block Diagram



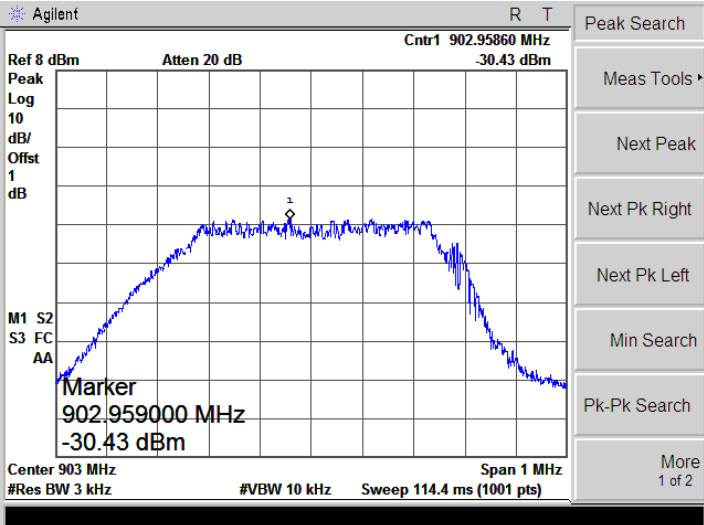
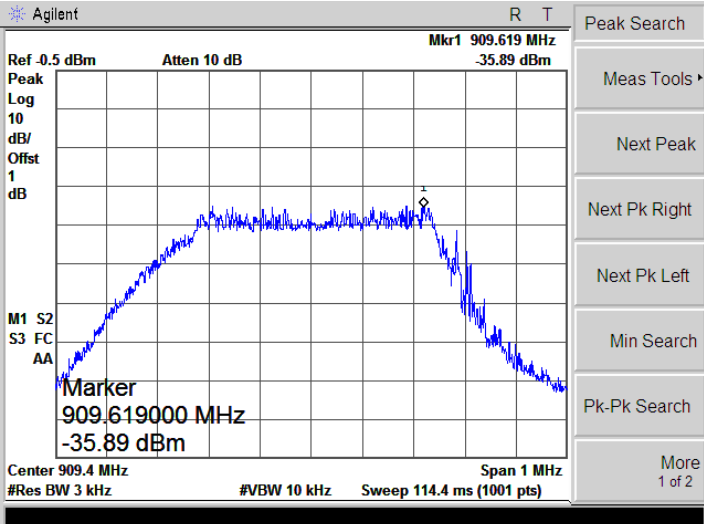
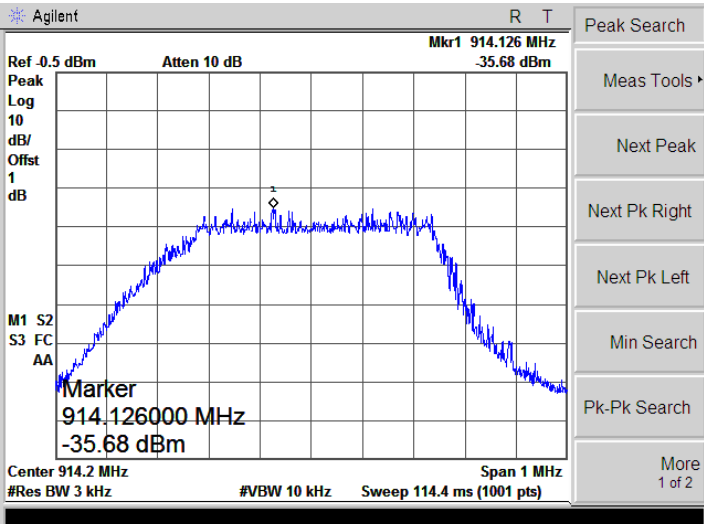
4.3 Test Procedure

According to the KDB 558074 D01 v05r02 Subclause 8.4 and ANSI C63.10-2013 Subclause 11.10.2, the test method of power spectral density as below:

- Set analyzer center frequency to DTS channel center frequency.
- Set the span to 1.5 times the DTS bandwidth.
- Set the RBW to: $3\text{kHz} \leq \text{RBW} \leq 100\text{kHz}$.
- Set the VBW $\geq 3 \times \text{RBW}$.
- Detector = peak.
- Sweep time = auto couple.
- Trace mode = max hold.
- Allow trace to fully stabilize.
- Use the peak marker function to determine the maximum amplitude level within the RBW.
- If measured value exceeds limit, reduce RBW (no less than 3kHz) and repeat.

4.4 Summary of Test Results/Plots

Channel	Power Spectral Density dBm/3kHz	Limit dBm/3kHz
Low	-30.43	8
Middle	-35.89	8
High	-35.68	8

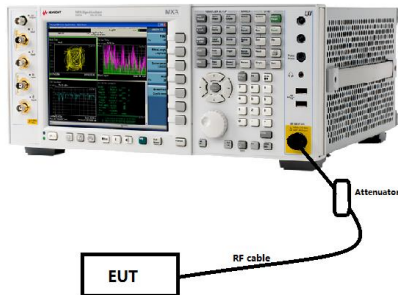
Low	
Middle	
High	

5. DTS Bandwidth

5.1 Standard Applicable

According to 15.247(a)(2), systems using digital modulation techniques may operate in the 902–928MHz, 2400–2483.5MHz, and 5725–5850MHz bands. The minimum 6dB bandwidth shall be at least 500kHz.

5.2 Test Setup Block Diagram



5.3 Test Procedure

According to the KDB 558074 D01 v05r02 Subclause 8.2 and ANSI C63.10-2013 Subclause 11.8.1, the test method of DTS Bandwidth as below:

- a) Set RBW = 100 kHz.
- b) Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
- c) Detector = Peak.
- d) Trace mode = max hold.
- e) Sweep = auto couple.
- f) Allow the trace to stabilize.
- g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

5.4 Summary of Test Results/Plots

Test Channel	6dB Bandwidth(kHz)	Result
Low	734.634	Pass
Middle	730.808	Pass
High	743.050	Pass

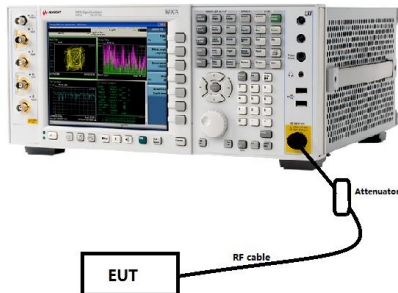
Low	Agilent Ch Freq 903 MHz Trig Free Occupied Bandwidth x dB -6.00 dB Ref -5 dBm Atten 5 dB #Peak Log 10 dB/ Offset 1 dB Center 903 MHz #Res BW 100 kHz #VBW 300 kHz Sweep 10 ms (1001 pts) Span 2 MHz Occupied Bandwidth 785.0137 kHz Occ BW % Pwr 99.00 % x dB -6.00 dB Transmit Freq Error -45.000 kHz x dB Bandwidth 734.634 kHz Meas Setup Avg Number 10 On Off Avg Mode Repeat Exp Max Hold On Off Occ BW % Pwr 99.00 % OBW Span 2.00000000 MHz x dB -6.00 dB Optimize Ref Level
Middle	Agilent Ch Freq 909.4 MHz Trig Free Occupied Bandwidth Center 909.4000000 MHz Ref -5 dBm Atten 5 dB #Peak Log 10 dB/ Offset 1 dB Center 909.4 MHz #Res BW 100 kHz #VBW 300 kHz Sweep 10 ms (1001 pts) Span 2 MHz Occupied Bandwidth 786.0292 kHz Occ BW % Pwr 99.00 % x dB -6.00 dB Transmit Freq Error -43.081 kHz x dB Bandwidth 730.808 kHz Trace/View 1 Trace 2 3 Clear Write Max Hold Min Hold View Blank More 1 of 2
High	Agilent Ch Freq 914.2 MHz Trig Free Occupied Bandwidth Center 914.2000000 MHz Ref -5 dBm Atten 5 dB #Peak Log 10 dB/ Offset 1 dB Center 914.2 MHz #Res BW 100 kHz #VBW 300 kHz Sweep 10 ms (1001 pts) Span 2 MHz Occupied Bandwidth 803.1744 kHz Occ BW % Pwr 99.00 % x dB -6.00 dB Transmit Freq Error -33.319 kHz x dB Bandwidth 743.050 kHz Trace/View 1 Trace 2 3 Clear Write Max Hold Min Hold View Blank More 1 of 2

6. RF Output Power

6.1 Standard Applicable

According to 15.247(b)(3), for systems using digital modulation in the 902–928MHz, 2400–2483.5MHz, and 5725–5850MHz bands: 1 Watt.

6.2 Test Setup Block Diagram



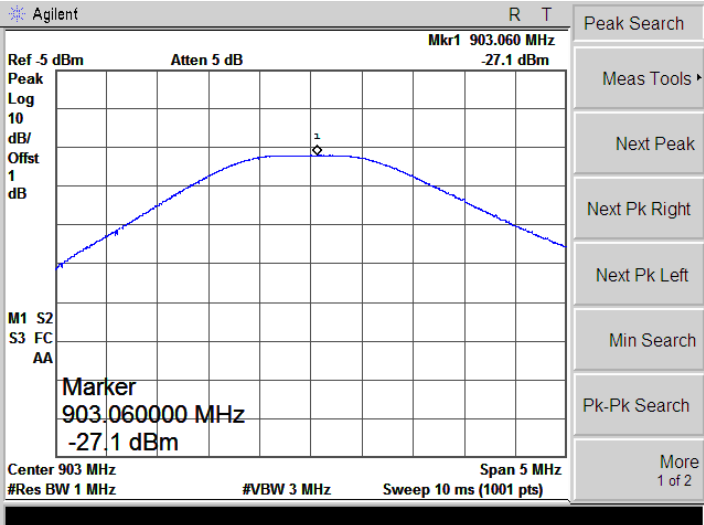
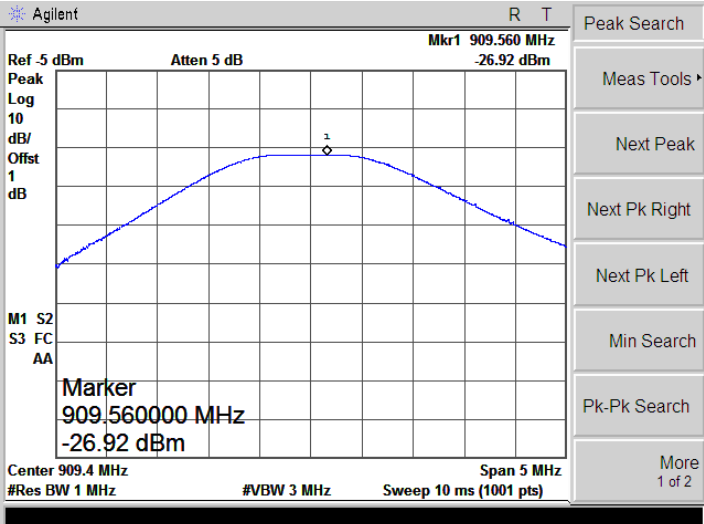
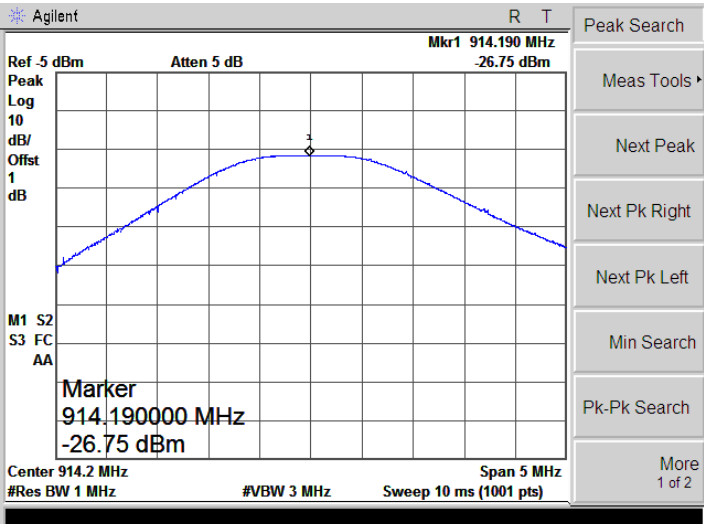
6.3 Test Procedure

According to the KDB-558074 D01 v05r02 Subclause 8.3.1.1 and ANSI C63.10-2013 Subclause 11.9.1.1, this procedure shall be used when the measurement instrument has available a resolution bandwidth that is greater than the DTS bandwidth.

- Set the RBW $\geq$ DTS bandwidth.
- Set VBW $\geq 3 \times$ RBW.
- Set span $\geq 3 \times$ RBW
- Sweep time = auto couple.
- Detector = peak.
- Trace mode = max hold.
- Allow trace to fully stabilize.
- Use peak marker function to determine the peak amplitude level.

6.4 Summary of Test Results/Plots

Test Channel	Measured Value dBm	Output Power mW	Limit mW
Low	-27.10	0.0019	1000
Middle	-26.92	0.0020	1000
High	-26.75	0.0021	1000

Low	
Middle	
High	

7. Field Strength of Spurious Emissions

7.1 Standard Applicable

According to §15.247(d), in any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30dB instead of 20dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a).

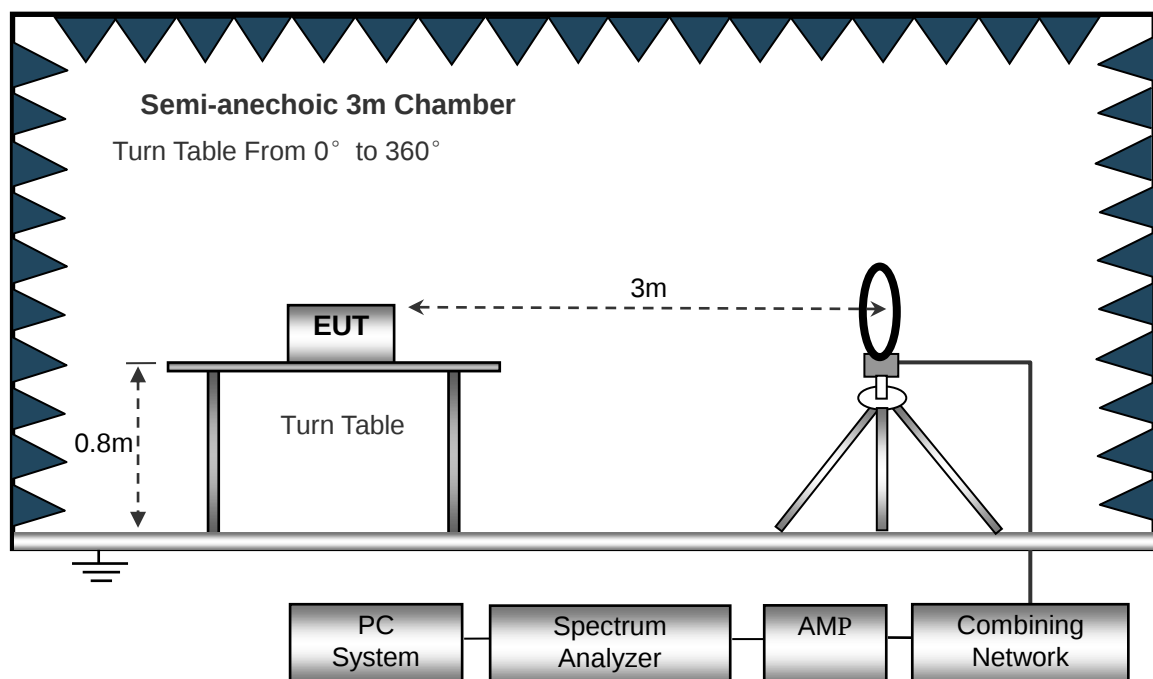
The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in §15.35 for limiting peak emissions apply. Spurious Radiated Emissions measurements starting below or at the lowest crystal frequency.

7.2 Test Procedure

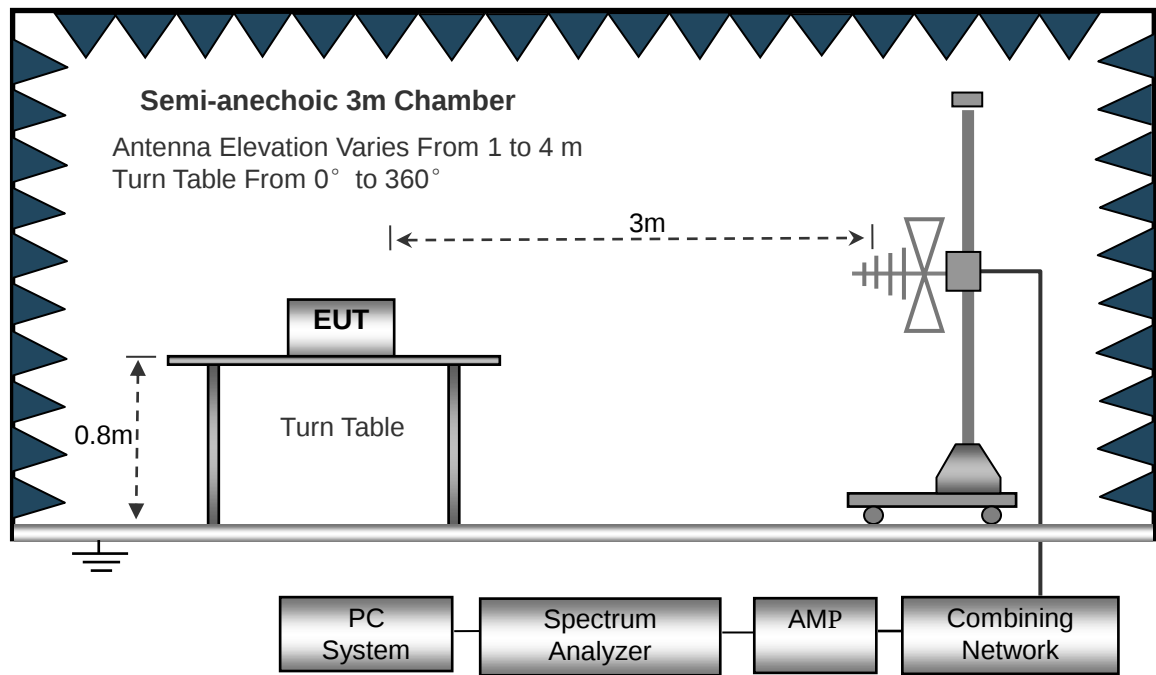
The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.205 15.247(a) and FCC Part 15.209 Limit.

The external I/O cables were draped along the test table and formed a bundle 30 to 40cm long in the middle. The spacing between the peripherals was 10cm.

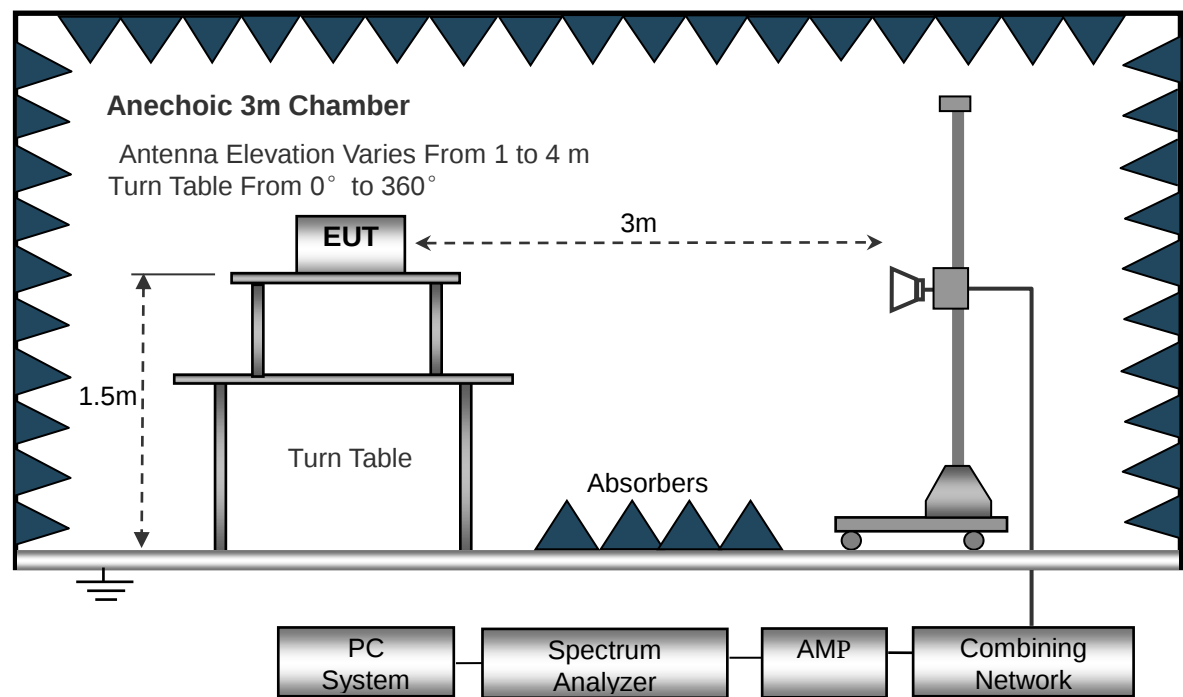
The test setup for emission measurement below 30MHz.



The test setup for emission measurement from 30MHz to 1GHz.



The test setup for emission measurement above 1GHz.



Frequency :9kHz-30MHz
RBW=10KHz,
VBW =30KHz
Sweep time= Auto
Trace = max hold
Detector function = peak

Frequency :30MHz-1GHz
RBW=120KHz,
VBW=300KHz
Sweep time= Auto
Trace = max hold
Detector function = peak, QP

Frequency :Above 1GHz
RBW=1MHz,
VBW=3MHz(Peak), 10Hz(AV)
Sweep time= Auto
Trace = max hold
Detector function = peak, AV

7.3 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and the Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

$$\text{Corr. Ampl.} = \text{Indicated Reading} + \text{Ant. Factor} + \text{Cable Loss} - \text{Ampl. Gain}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -6dB μ V means the emission is 6dB μ V below the maximum limit. The equation for margin calculation is as follows:

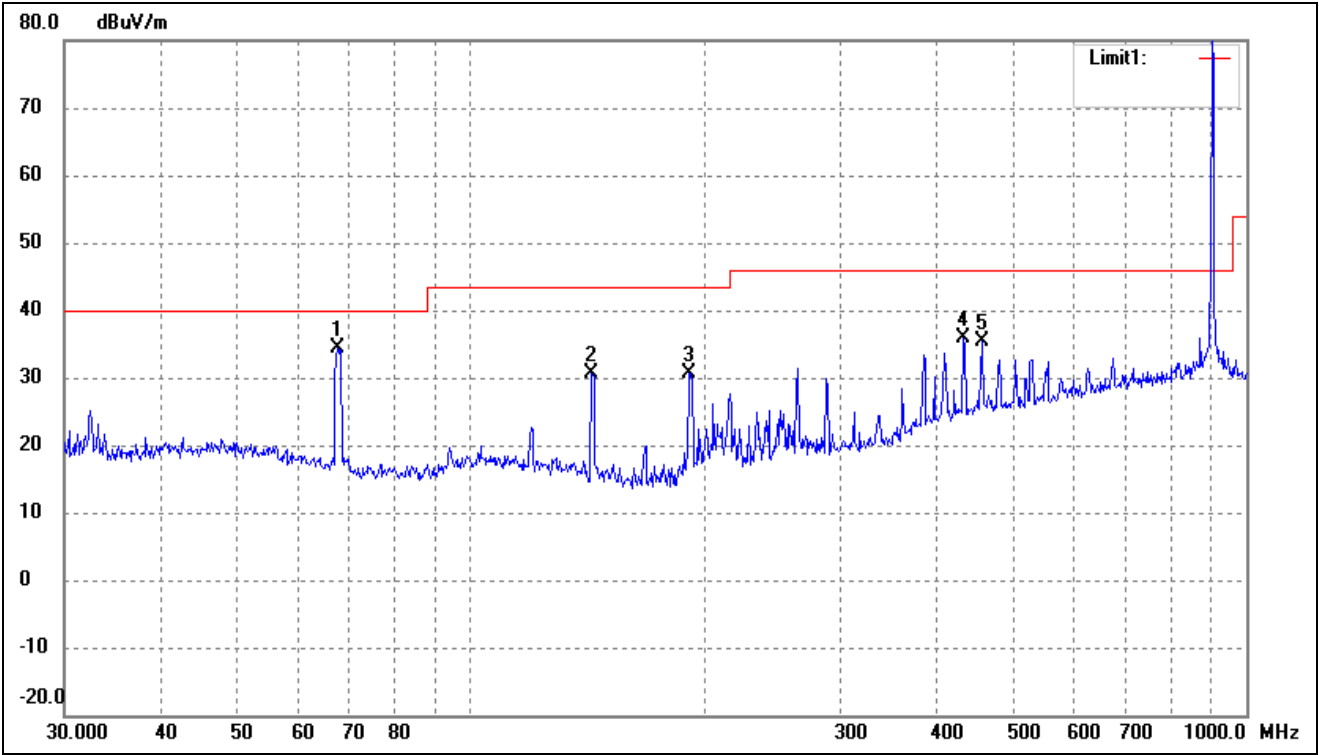
$$\text{Margin} = \text{Corr. Ampl.} - \text{FCC Part 15 Limit}$$

7.4 Summary of Test Results/Plots

Note: this EUT was tested in 3 orthogonal positions and the worst case position data was reported.

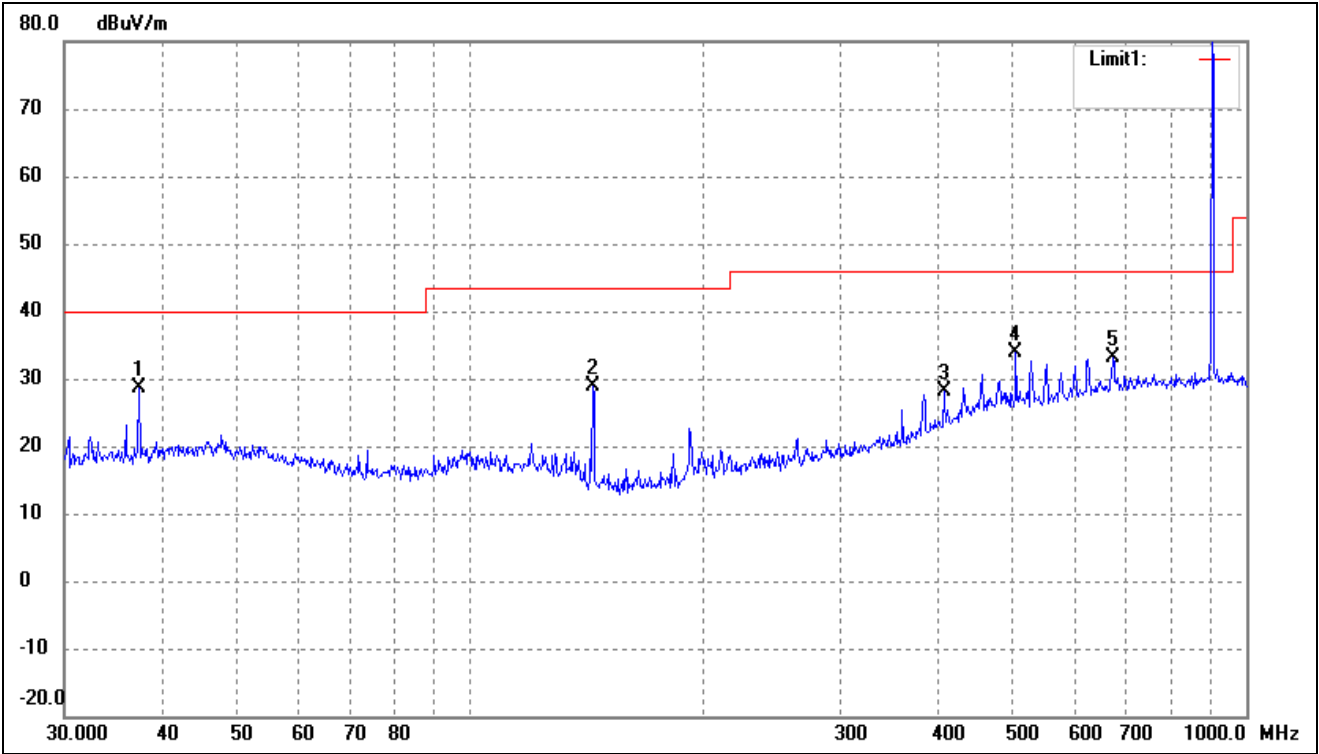
➤ Spurious Emissions Below 1GHz

Test Channel	Low Channel	Polarity:	Horizontal
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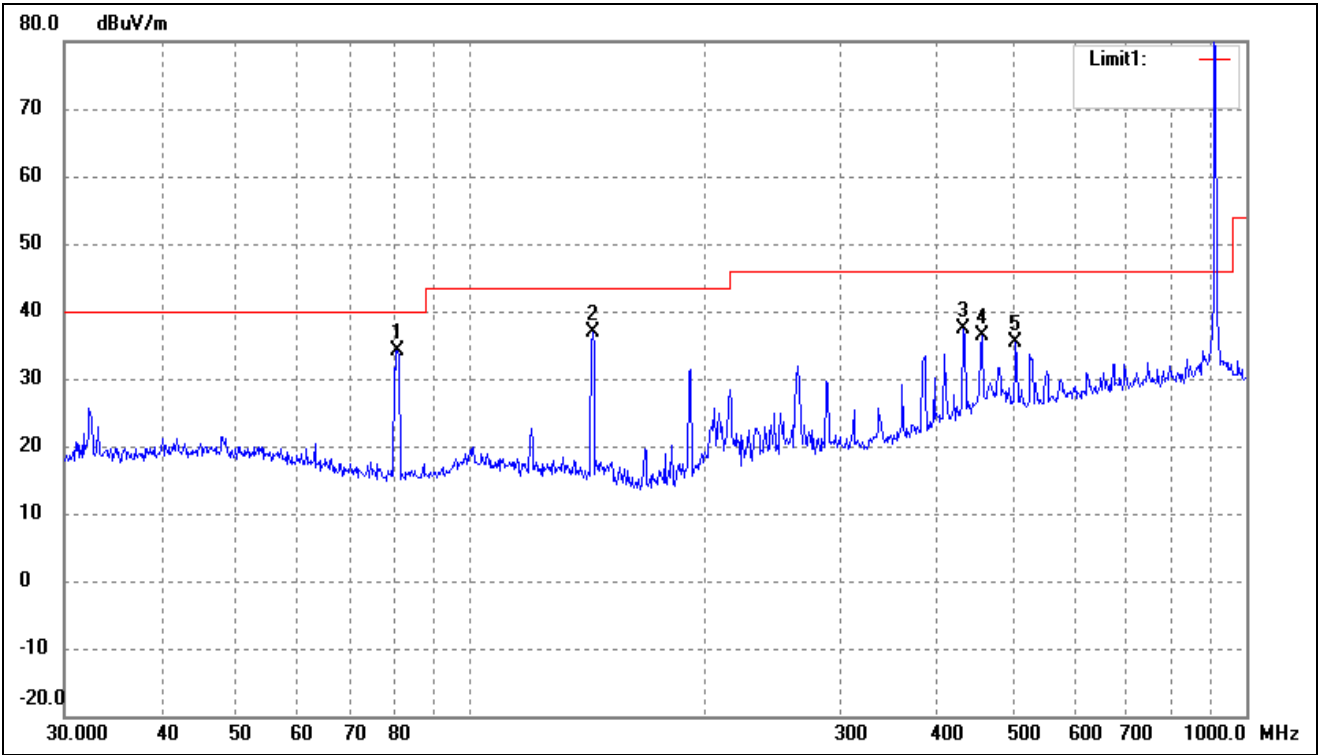
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	67.4381	44.21	-9.72	34.49	40.00	-5.51	-	-	peak
2	143.3260	42.89	-12.38	30.51	43.50	-12.99	-	-	peak
3	191.7450	40.69	-9.98	30.71	43.50	-12.79	-	-	peak
4	431.0316	38.95	-3.06	35.89	46.00	-10.11	-	-	peak
5	455.9057	37.84	-2.41	35.43	46.00	-10.57	-	-	peak
6	903.3093	84.99	2.74	87.73	/	/	-	-	Fundamental

Test Channel	Low Channel	Polarity:	Vertical
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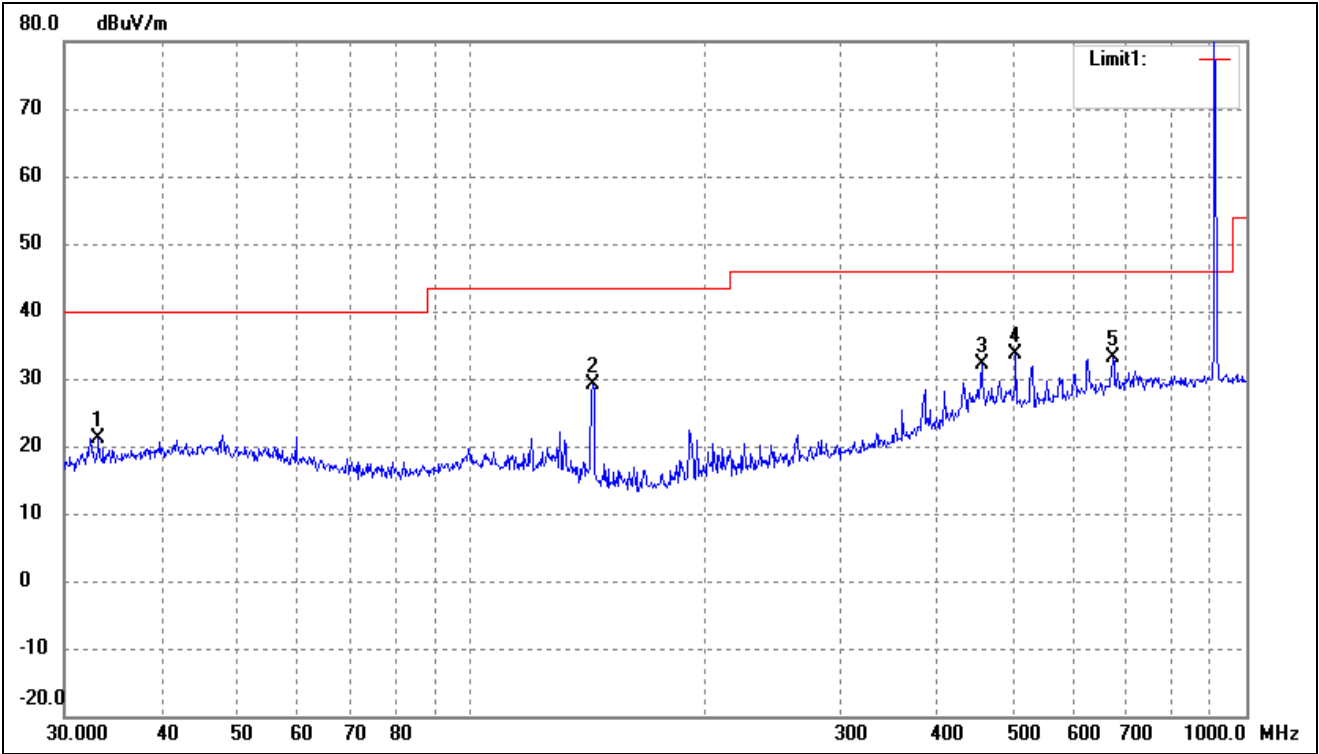
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	37.4164	36.36	-7.63	28.73	40.00	-11.27	-	-	peak
2	143.8294	41.37	-12.40	28.97	43.50	-14.53	-	-	peak
3	407.5144	31.71	-3.69	28.02	46.00	-17.98	-	-	peak
4	504.7062	35.21	-1.22	33.99	46.00	-12.01	-	-	peak
5	672.8444	32.00	1.15	33.15	46.00	-12.85	-	-	peak
6	903.3093	84.98	2.74	87.72	/	/	-	-	Fundamental

Test Channel	Middle Channel	Polarity:	Horizontal
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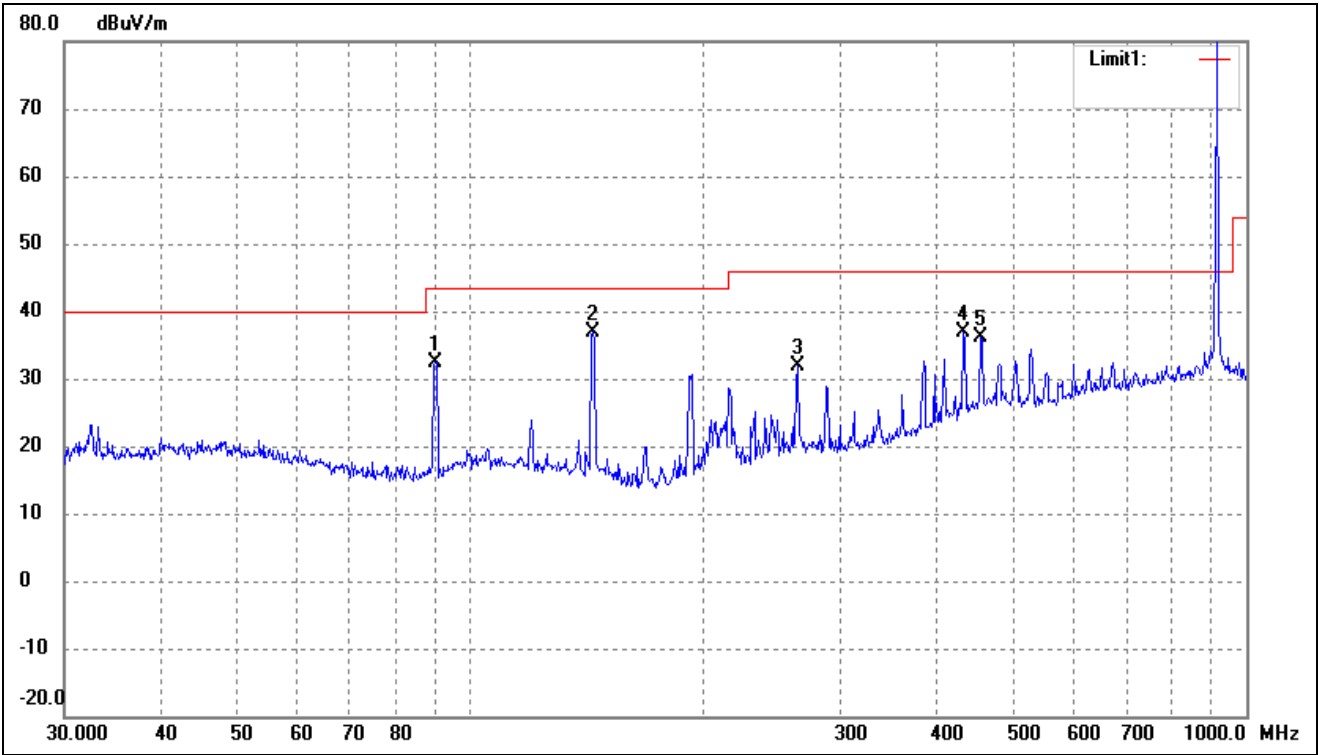
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	80.6441	44.89	-10.71	34.18	40.00	-5.82	-	-	peak
2	143.8294	49.38	-12.40	36.98	43.50	-6.52	-	-	peak
3	431.0316	40.45	-3.06	37.39	46.00	-8.61	-	-	peak
4	455.9057	38.67	-2.41	36.26	46.00	-9.74	-	-	peak
5	504.7062	36.67	-1.22	35.45	46.00	-10.55	-	-	peak
6	909.6666	84.99	2.72	87.71	/	/	-	-	Fundamental

Test Channel	Middle Channel	Polarity:	Vertical
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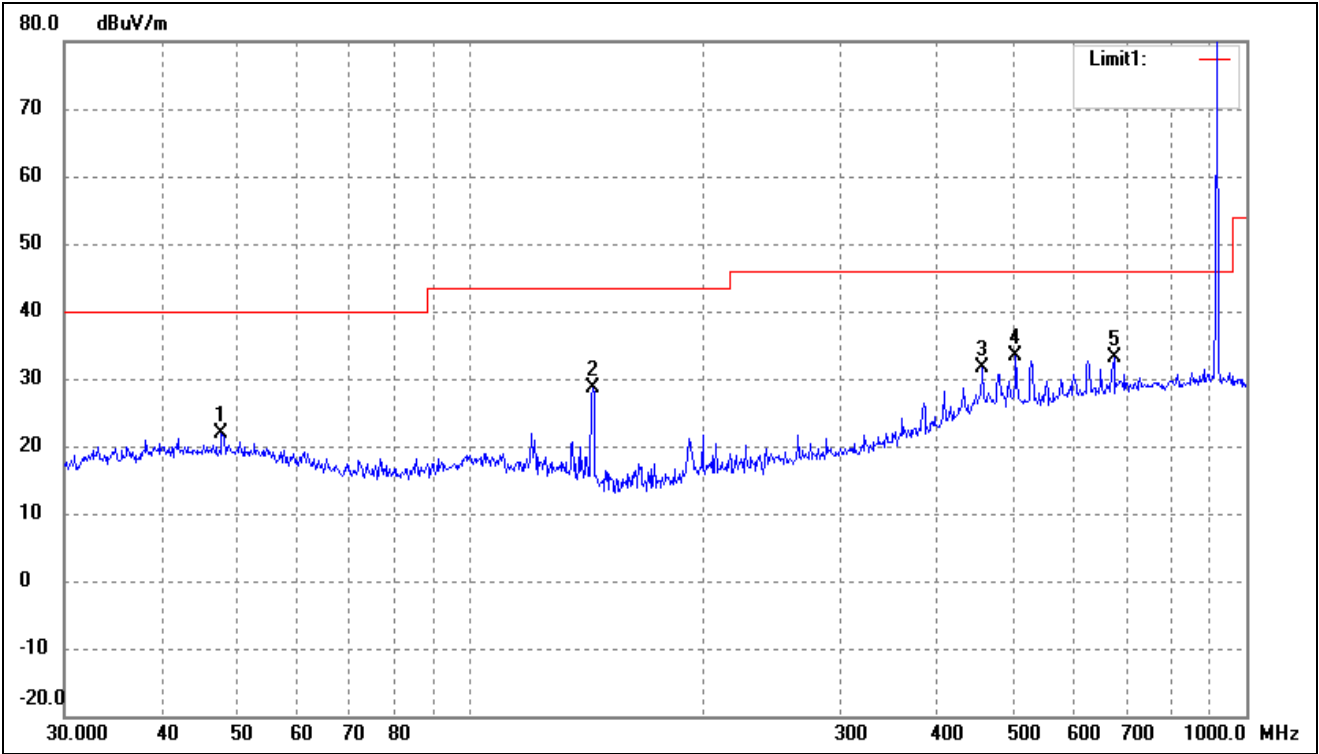
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	33.2111	29.89	-8.67	21.22	40.00	-18.78	-	-	peak
2	143.8294	41.63	-12.40	29.23	43.50	-14.27	-	-	peak
3	455.9057	34.42	-2.41	32.01	46.00	-13.99	-	-	peak
4	504.7062	34.88	-1.22	33.66	46.00	-12.34	-	-	peak
5	672.8444	31.91	1.15	33.06	46.00	-12.94	-	-	peak
6	909.6666	85.00	2.72	87.72	/	/	-	-	Fundamental

Test Channel	High Channel	Polarity:	Horizontal
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No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	90.2205	42.87	-10.54	32.33	43.50	-11.17	-	-	peak
2	143.8293	49.28	-12.40	36.88	43.50	-6.62	-	-	peak
3	263.8190	39.91	-7.94	31.97	46.00	-14.03	-	-	peak
4	432.5457	39.87	-3.02	36.85	46.00	-9.15	-	-	peak
5	454.3100	38.49	-2.45	36.04	46.00	-9.96	-	-	peak
6	916.0687	85.00	2.69	87.69	/	/	-	-	Fundamental

Test Channel	High Channel	Polarity:	Vertical
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No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	47.8260	28.94	-6.96	21.98	40.00	-18.02	-	-	peak
2	143.8294	40.98	-12.40	28.58	43.50	-14.92	-	-	peak
3	457.5072	33.94	-2.37	31.57	46.00	-14.43	-	-	peak
4	504.7062	34.60	-1.22	33.38	46.00	-12.62	-	-	peak
5	675.2078	31.86	1.18	33.04	46.00	-12.96	-	-	peak
6	916.0687	85.00	2.69	87.69	/	/	-	-	Fundamental

Remark: '-Means' the test Degree and Height are not recorded by the test software and only show the worst case in the test report.

➤ Spurious Emissions Above 1GHz

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB	(dBuV/m)	(dBuV/m)	(dB)	H/V	
Low Channel-903.0MHz							
1806.000	61.43	-11.79	49.64	74.00	-24.36	H	PK
2709.000	53.83	-9.97	43.86	74.00	-30.14	H	PK
1806.000	58.15	-11.79	46.36	74.00	-27.64	V	PK
2706.000	53.24	-9.97	43.27	74.00	-30.73	V	PK
Middle Channel-909.4MHz							
1818.800	61.34	-11.76	49.58	74.00	-24.42	H	PK
2728.200	54.63	-9.91	44.72	74.00	-29.28	H	PK
1818.800	58.33	-11.76	46.57	74.00	-27.43	V	PK
2728.200	54.42	-9.91	44.51	74.00	-29.49	V	PK
High Channel-914.2MHz							
1828.100	61.40	-11.73	49.67	74.00	-24.33	H	PK
2741.574	55.58	-9.86	45.72	74.00	-28.28	H	PK
1828.100	58.30	-11.73	46.57	74.00	-27.43	V	PK
2741.574	53.20	-9.86	43.34	74.00	-30.66	V	PK

Note: Testing is carried out with frequency rang 9kHz to the tenth harmonics, other than listed in the table above are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

8. Out of Band Emissions

8.1 Standard Applicable

According to §15.247(d), in any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30dB instead of 20dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a).

8.2 Test Procedure

According to the KDB 558074 D01 v05r02 Subclause 8.4 and ANSI C63.10-2013 Subclause 11.11, the Emissions in nonrestricted frequency bands test method as follows:

- a) Set the center frequency and span to encompass frequency range to be measured.
- b) Set the RBW = 100kHz.
- c) Set the VBW $\geq [3 \times \text{RBW}]$.
- d) Detector = peak.
- e) Sweep time = auto couple.
- f) Trace mode = max hold.
- g) Allow trace to fully stabilize.
- h) Use the peak marker function to determine the maximum amplitude level.

According to the KDB 558074 D01 v05r02 Subclause 8.5 and ANSI C63.10-2013 Subclause 11.12, the Emissions in restricted frequency bands test method as follows:

A. Radiated emission measurements:

Set span = wide enough to capture the peak level of the emission operating on the channel closest to the bandedge, as well as any modulation products which fall outside of the authorized band of operation (2310MHz to 2420MHz for low bandedge, 2460MHz to 2500MHz for the high bandedge)

RBW = 1MHz, VBW = 1MHz for peak value measured

RBW = 1MHz, VBW = 10Hz for average value measured

Sweep = auto; Detector function = peak/average; Trace = max hold

All the trace to stabilize, set the marker on the emission at the bandedge, or on the highest modulation product

outside of the band, if this level is greater than that at the bandedge. Enable the marker-delta function, then

use the marker-to-peak function to move the marker to the peak of the in-band emission. Those emission must comply with the 15.209 limit for fall in the restricted bands listed in section 15.205. Note that the method of measurement KDB publication number: 913591 may be used for the radiated bandedge measurements.

B. Antenna-port conducted measurements

Peak emission levels are measured by setting the instrument as follows:

- a) RBW = as specified in Table 9.
- b) VBW $\geq [3 \times \text{RBW}]$.
- c) Detector = peak.
- d) Sweep time = auto.
- e) Trace mode = max hold.
- f) Allow sweeps to continue until the trace stabilizes. (Note that the required measurement time may be lengthened for low-duty-cycle applications.)

RBW as a function of frequency

Frequency	RBW
9kHz to 150kHz	200Hz to 300Hz
0.15MHz to 30MHz	9kHz to 10kHz
30MHz to 1000MHz	100kHz to 120kHz
>1000MHz	1MHz

If the peak-detected amplitude can be shown to comply with the average limit, then it is not necessary to perform a separate average measurement.

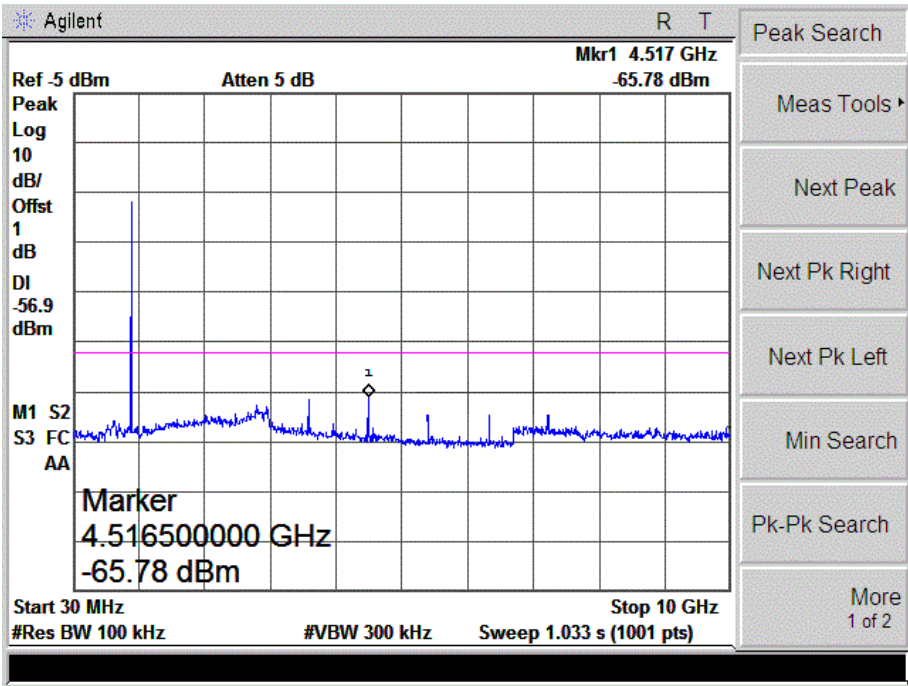
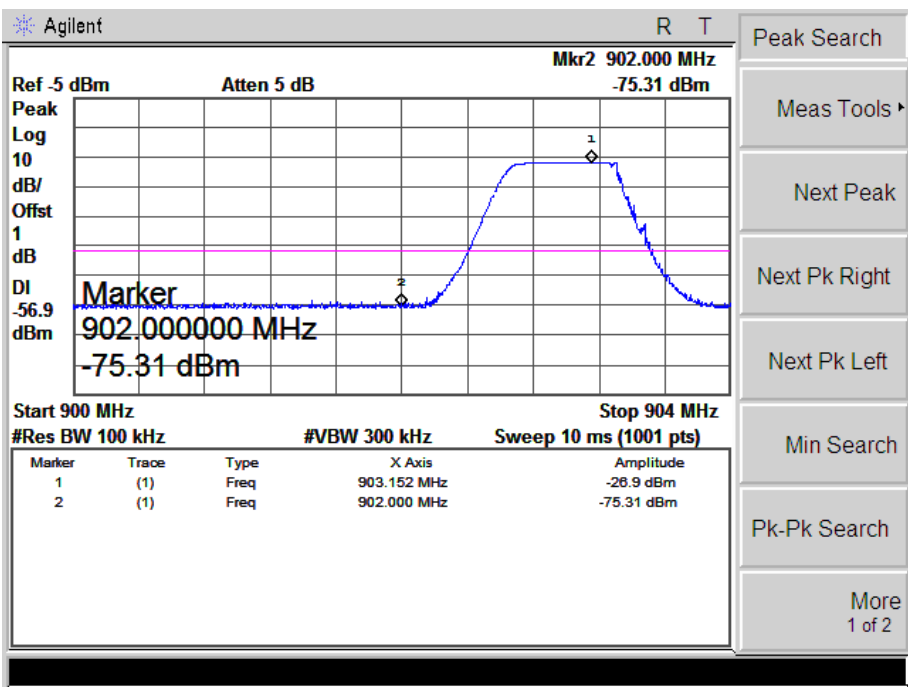
Ensure that the amplitude of all unwanted emissions outside of the authorized frequency band (excluding restricted frequency bands) are attenuated by at least the minimum requirements specified in section 8.1.

Report

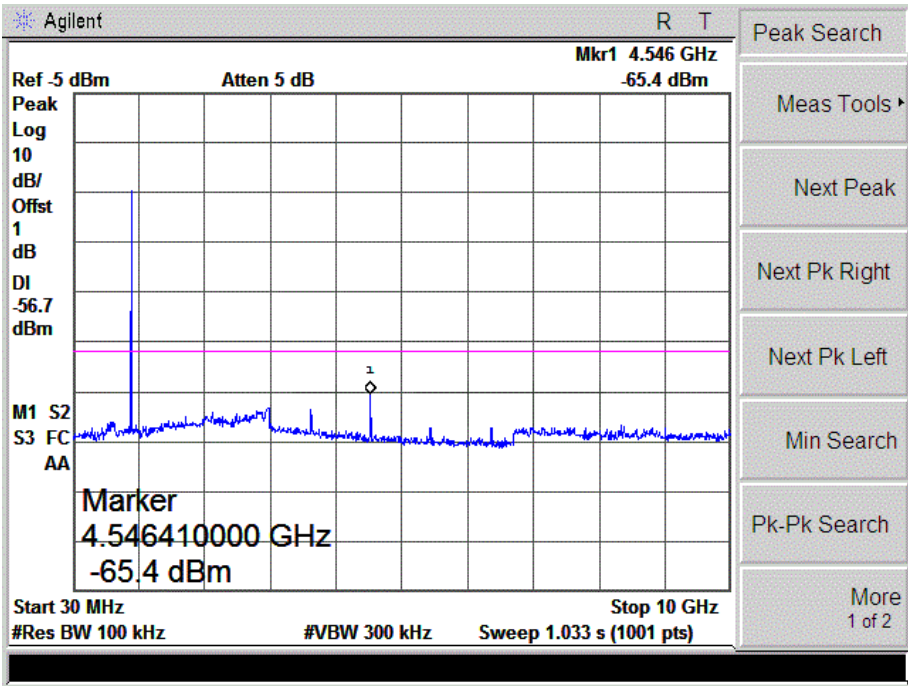
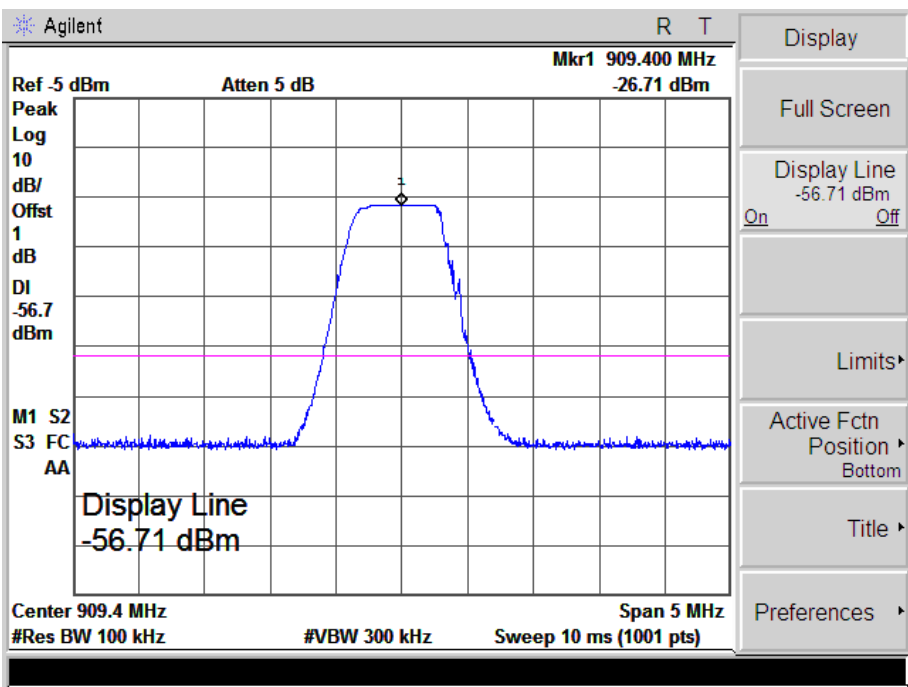
the three highest emissions relative to the limit.

8.3 Summary of Test Results/Plots

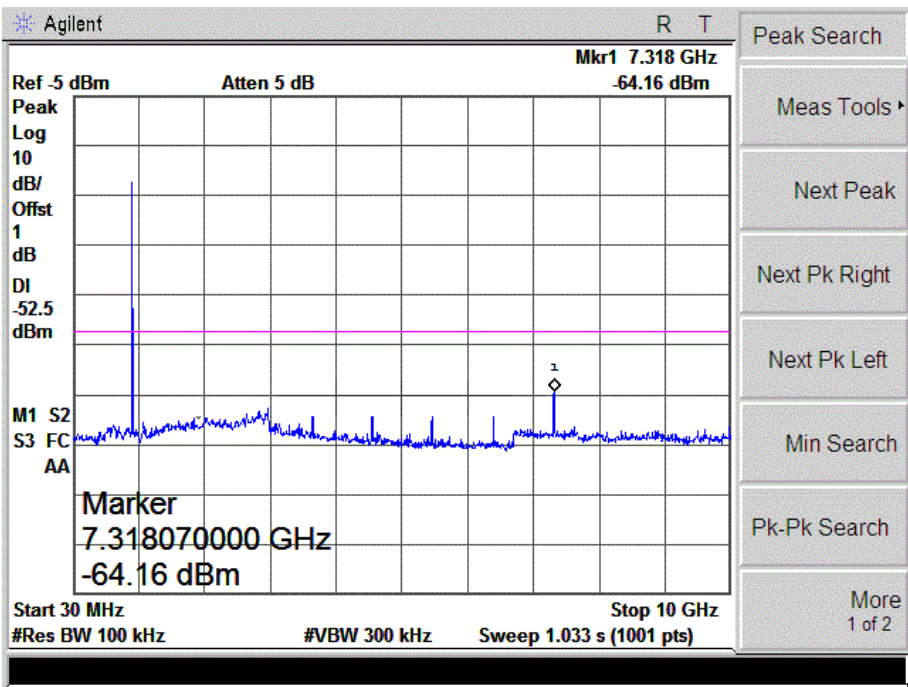
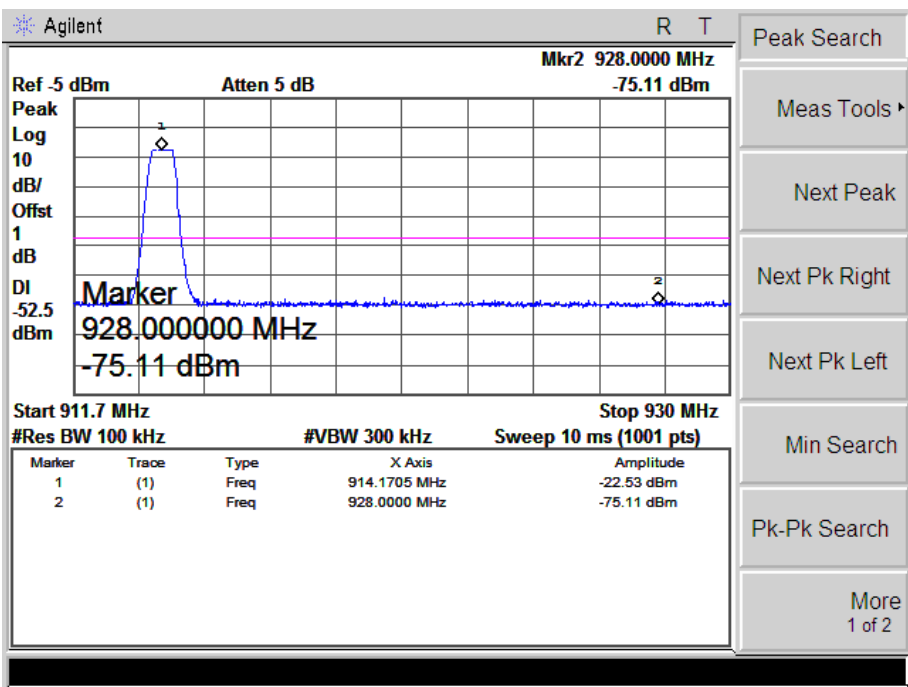
Low Channel



Middle Channel



High Channel



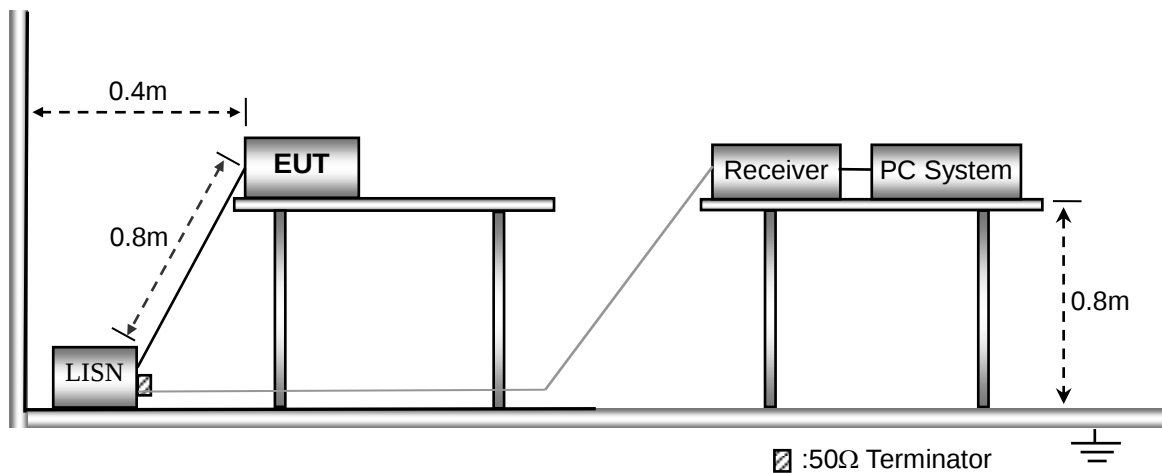
9. Conducted Emissions

9.1 Test Procedure

The setup of EUT is according with per ANSI C63.4-2014 measurement procedure. The specification used was with the FCC Part 15.207 Limit.

The external I/O cables were draped along the test table and formed a bundle 30 to 40cm long in the middle. The spacing between the peripherals was 10cm.

9.2 Basic Test Setup Block Diagram



9.3 Test Receiver Setup

During the conducted emission test, the test receiver was set with the following configurations:

Start Frequency	150kHz
Stop Frequency	30MHz
Sweep Speed	Auto
IF Bandwidth.....	10kHz
Quasi-Peak Adapter Bandwidth	9kHz
Quasi-Peak Adapter Mode	Normal

9.4 Summary of Test Results/Plots

Not applicable

APPENDIX PHOTOGRAPHS

Please refer to “ANNEX”

***** END OF REPORT *****