Nemko Korea Co., Ltd.

155 & 159, Osan-Ro, Mohyeon-Myeon, Cheoin-Gu, Yongin-Si, Gyeonggi-Do 449-852 KOREA, REPUBLIC OF
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FCC and IC EVALUATION REPORT FOR CERTIFICATION

Applicant :

Samsung Electronics Co., Ltd.
129, Samsung-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, Korea
(Post code : 443-742)
Attn. : Mr. Jaywoo. Lee

Dates of Issue : June 13, 2013
Test Report No. : NK-13-R-125-1
Test Site : Nemko Korea Co., Ltd.

FCC ID	**A3LWIDA10**
IC	**649E-WIDA10**
Brand Name	**SAMSUNG**
Contact Person	**Samsung Electronics Co., Ltd.** **129, Samsung-ro, Yeongtong-gu,** **Suwon-Si, Gyeonggi-Do, Korea, 443-742.** **Mr. Jaywoo. Lee** **Telephone No. : +82-31-277-2569**

Applied Standard:	FCC 47 CFR Part 15C and IC RSS-210 Issue 8
Classification:	Digital modulation Transmitter
EUT Type:	Audio transceiver module

The device bearing the brand name and model specified above has been shown to comply with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.4-2003, ANSI C63.10. The client should not use it to claim product endorsement by TAF or any government agencies. The test results in the report only apply to the tested sample.

I attest to the accuracy of data and all measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

Jun. 13, 2013
Tested By : Jin-ha Ko
Engineer

Deokha Ryu Jun 13. 2013
Reviewed By : Deokha Ryu
Technical Manager

TABLE OF CONTENTS

1. SCOPE

Measurement and determination of electromagnetic emissions (EME) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission under FCC part 15 subpart C and IC RSS-210 Issue 8.

Responsible Party :	Samsung Electronics Co., Ltd.
Contact Person :	Mr. Jaywoo. Lee
Manufacturer :	Samsung Electronics Co., Ltd. 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, Korea 443-742

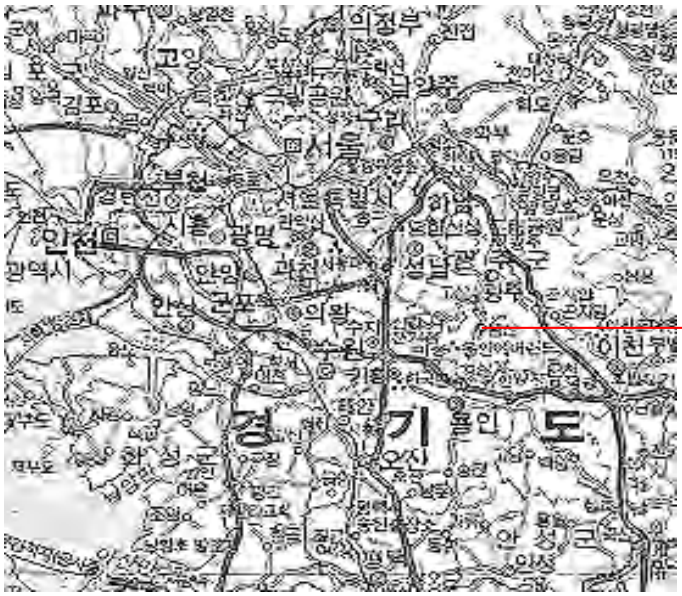
- FCC ID: A3LWIDA10
- IC : 649E-WIDA10
- Model: WIDA10
- Brand Name: SAMSUNG
- EUT Type: Audio transceiver module
- Classification: Digital modulation Transmitter
- Applied Standard: FCC 47 CFR Part 15 subpart C and IC RSS-210 Issue 8
- Test Procedure(s): ANSI C63.4-2003, ANSI C63.10 and FCC guidance of 558074 D01 v03r01
- Dates of Test: May 20, 2013 ~ June 03, 2013
- Place of Tests: Nemko Korea Co., Ltd.

2. INTRODUCTION

2.1 Test facility

The measurement procedure described in American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz (ANSI C63.4-2003), the American National Standard for Testing Unlicensed Wireless Devices (ANSI C63.10-2009) were used in determining radiated and conducted emissions emanating from **Samsung Electronics Co., Ltd.**
FCC ID : A3LWIDA10 and **IC : 649E-WIDA10**

These measurement tests were conducted at ***Nemko Korea Co., Ltd. EMC Laboratory***.
The site address is 155 & 159, Osan-Ro, Mohyeon-Myeon, Cheoin-Gu, Yongin-Si, Gyeonggi-Do, 449-852 KOREA, REPUBLIC OF.
The area of Nemko Korea Corporation Ltd. EMC Test Site is located in a mountain area at 80 kilo-meters (48 miles) southeast and Incheon International Airport (Incheon Airport), 30 kilometers (18 miles) south-southeast from central Seoul.
It is located in the valley surrounded by mountains in all directions where ambient radio signal conditions are quiet and a favorable area to measure the radio frequency interference on open field test site for the computing and ISM devices manufactures.
The detailed description of the measurement facility was found to be in compliance with the requirements of §2.948 according to ANSI C63.4 2003.



Nemko Korea Co., Ltd.
EMC Lab.

155 & 159, Osan-Ro, Mohyeon-Myeon, Cheoin-Gu, Yongin-Si, Gyeonggi-Do, 449-852 KOREA, REPUBLIC OF
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Fax)+82-31-322-2332

Fig. 1. The map above shows the Seoul in Korea vicinity area.
The map also shows Nemko Korea Corporation Ltd. EMC Lab. and Incheon Airport.

2.2 Accreditation and listing

Accreditation type		Accreditation number
FC	FCC part 15/18 Filing site	Registration No. 97992
	CAB Accreditation for DOC	Designation No. KR0026
KOLAS	KOLAS Accredited Lab. (Korea Laboratory Accreditation Scheme)	Registration No. 155
Industry Canada	Canada IC Registered site	Site No. 2040E
VCCI	VCCI registration site(RE/CE/Telecom CE)	Member No. 2118
IECEE CB SCHEME	EMC CBTL	-
방송통신위원회	KCC(RRL)Designated Lab.	Registration No. KR0026
	SASO registered Lab and Certification Body	Registration No. 2008-15

3. TEST CONDITIONS & EUT INFORMATION

3.1 Operation During Test

The EUT was controlled and monitored by testing Jig which manufacturer supported.
The EUT have two antennas which are not working simultaneously. All tests were performed at two antenna paths then the worst case was recorded.
The Laptop and test Jig were used to control the EUT to transmit the wanted TX channel and maximum output power. During the test, the EUT was operating with a duty cycle 100 %.

The EUT was programmed with the following power setting that used during the testing:

Frequency	2412 MHz ~ 2464 MHz	5736 MHz ~ 5814 MHz
Power setting Level	480	318

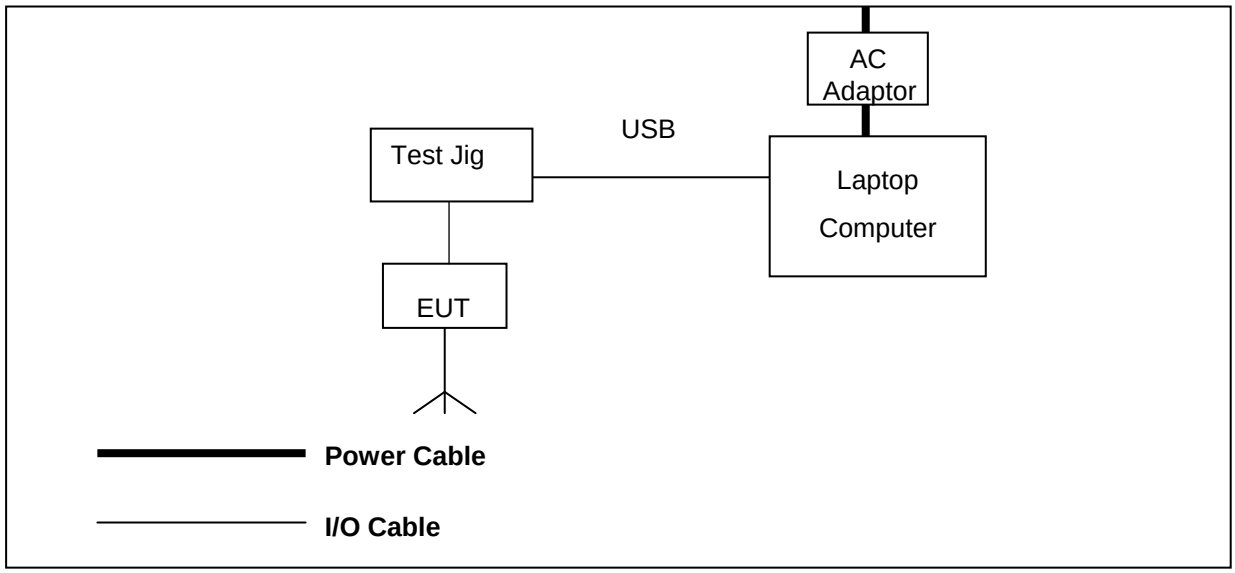
Table of test modes and channels :

Frequency band	Mode	Test Channel	Frequency (MHz)
2.4 GHz	QPSK modulation	Low	2412
		Middle	2438
		High	2464
5.7 GHz	QPSK modulation	Low	5736
		Middle	5762
		High	5814

3.2 Support Equipment

EUT	Samsung Electronics Co., Ltd. FCC ID: A3LWIDA10	S/N: N/A
Laptop Computer	Samsung Electronics Co., Ltd. Model : NT-R55 1.2 m shielded USB cable	FCC DOC S/N : 408L93AP400115W
AC/DC Adapter	Chicony Power Technology Co., Ltd. Model : AD-9019R 1.2 m unshielded power cable	FCC DOC S/N : CNBA440024ADON897I2602

3.3 Setup Drawing



3.4 EUT Information

The EUT is the **Samsung Audio transceiver module FCC ID: A3LWIDA10, IC: 649E-WIDA10**.

Specifications for Audio transmitting:

Category	Audio transceiver module
Model Name	WIDA10
Frequency of Operation	2412 MHz ~ 2464 MHz 5736 MHz ~ 5814 MHz
Power Output (Conducted)	2 GHz: 16.08 dBm 5 GHz: 14.40 dBm
Channels	2 GHz: 3 ch 5 GHz: 3 ch
Antenna Gain (peak)	2 GHz : 3.58 dBi 5 GHz : 3.93 dBi
Modulations	QPSK
Temperature Range	0 ℃ ~ +60 ℃
Voltage	5.0 Vdc
Dimensions (W x H x D)	43 mm x 80 mm X 11 mm
Weight	27 g
Remarks	-

4. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specification:

Name of Test	FCC Paragraph No.	IC Paragraph No.	Result	Remark
Conducted Emission	15.207	RSS-GEN 7.2.4	Complies	
Radiated Emission	15.209	RSS-210 Issue 8 A8.5	Complies	
6 dB Bandwidth	15.247(a)(2)	RSS-210 Issue 8 A8.2	Complies	
Maximum Peak Output Power	15.247(b)(3)	RSS-210 Issue 8 A8.4(2)	Complies	
Power Spectral Density	15.247(e)	RSS-210 Issue 8 A8.2	Complies	
Conducted Spurious Emission	15.247(d)	RSS-210 Issue 8 A8.5	Complies	
Radiated Spurious Emission	15.247(d)	RSS-210 Issue 8 A8.5	Complies	
Maximum Permissible Exposure	1.1307(b)	RSS-102	Complies	

5. RECOMMENDATION/CONCLUSION

The data collected shows that the **Samsung Audio transceiver module FCC ID: A3LWIDA10, IC: 649E-WIDA10** is in compliance with Part 15 Subpart C 15.247 of the FCC Rules.

6. ANTENNA REQUIREMENTS

§15.203 of the FCC Rules part 15 Subpart C

: 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.

The antenna of the **Samsung Audio transceiver module FCC ID: A3LWIDA10, IC: 649E-WIDA10** is **permanently attached** and there are no provisions for connection to an external antenna. It complies with the requirement of §15.203.

7. DESCRIPTION OF TESTS

7.1 Conducted Emissions

The Line conducted emission test facility is located inside a 4 x 7 x 2.5 meter shielded enclosure. It is manufactured by EM engineering. The shielding effectiveness of the shielded room is in accordance with MIL-STD-285 or NSA 65-6. A 1 m x 1.5 m wooden table 0.8 m height is placed 0.4 m away from the vertical wall and 1.5 m away from the side of wall of the shielded room Rohde & Schwarz (ESH3-Z5) and (ESH2-Z5) of the 50 ohm/50 µH Line Impedance Stabilization Network (LISN) are bonded to the shielded room. The EUT is powered from the Rohde & Schwarz LISN (ESH3-Z5) and the support equipment is powered from the Rohde & Schwarz LISN (ESH2-Z5). Power to the LISNs are filtered by high-current high insertion loss Power line filters. The purpose of filter is to attenuate ambient signal interference and this filter is also bonded to shielded enclosure. All electrical cables are shielded by tinned copper zipper tubing with inner diameter of 1 / 2 ". If DC power device, power will be derived from the source power supply it normally will be powered from and this supply lines will be connected to the LISNs, All interconnecting cables more than 1 meter were shortened by non inductive bundling (serpentinefashion) to a 1 meter length. Sufficient time for EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The RF output of the LISN was connected to the spectrum analyzer to determine the frequency producing the maximum EME from the EUT. The spectrum was scanned from 150 kHz to 30 MHz with 200 msec sweep time. The frequency producing the maximum level was re-examined using the EMI test receiver. (Rohde & Schwarz ESCS30). The detector functions were set to CISPR quasi-peak mode & average mode. The bandwidth of receiver was set to 9 kHz. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each EME emission. Each emission was maximized by; switching power lines; varying the mode of operation or resolution; clock or data exchange speed; scrolling H pattern to the EUT and of support equipment, and powering the monitor from the floor mounted outlet box and computer aux AC outlet, if applicable; whichever determined the worst case emission.

Each EME reported was calibrated using the R&S signal generator.

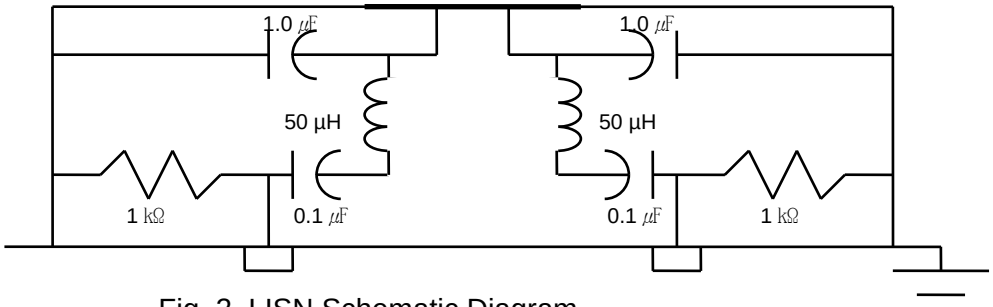


Fig. 2. LISN Schematic Diagram

7.2 Radiated Emissions

The measurement was performed at the test site that is specified in accordance with ANSI C63.4-2003 and ANCI C63.10-2009.
The spurious emission was scanned from 9 kHz to 30 MHz using Loop Antenna(Rohde&Schwarz, HFH2-Z2) and 30 to 1000 MHz using Trilog broadband test antenna(Schwarzbeck, VULB 9168). Above 1 GHz, Horn antenna (Schwarzbeck BBHA 9120D: up to 18 GHz, Q-par Angus QSH20S20 : 18 to 26.5 GHz, QSH22K20: up to 40 GHz) was used.
The test equipment was placed on turntable with 0.8 m above ground. Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The EUT, cable, wire arrangement and mode of operation that has the highest amplitude relative to the limit was selected. Then, the turn table was rotated from 0˚ to 360˚ and an antenna mast was moved from 1 m to 4 m height to maximize the suspected highest amplitude signal. The final maximized level was recorded.

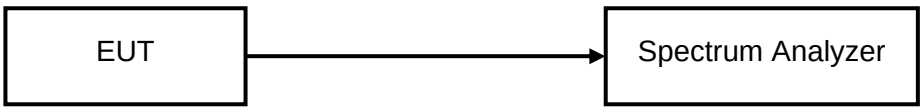
At frequencies below 1000 MHz, measurements performed using the CISPR quasi-peak detection. At frequencies above 1000 MHz, measurements performed using the peak and average measurement procedures described in KDB “558074D01 DTS Meas Guidance v03r01” in section 12.2.4 and 12.2.5.1. Peak emission levels were measured by setting the analyzer RBW = 1 MHz, VBW = 3 MHz, Detector = Peak, Trace mode = max hold. Average emission levels were measured by setting the analyzer RBW = 1 MHz, VBW = 3 MHz, Detector = RMS, Trace averaging in power averaging (RMS) mode over a minimum of 100 traces, when the EUT was configured to transmit with duty cycle ≥ 98 percent.

Frequency (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

Radiated Emissions Limits per 47 CFR 15.209(a)

7.3 6 dB Bandwidth

Test Setup



Test Procedure

EUTs 6 dB bandwidth is measured at low, middle, high channels with a spectrum analyzer connected to the antenna terminal while the EUTs operating at its maximum power control level. The spectrum analyzer setting is as follows.

RBW = 100 kHz

VBW ≥ 3 x RBW

Detector = Peak

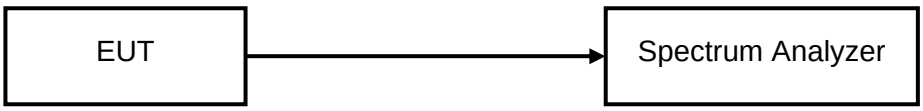
Trace mode = max hold

Sweep = auto couple

The bandwidth measurement function on the spectrum analyzer is used to measure the 6 dB bandwidth.

7.4 Maximum Peak Output Power

Test Setup



Test Procedure

EUTs Maximum Peak Conducted Output Power is measured at low, middle, high channels with a spectrum analyzer connected to the antenna terminal while the EUTs operating at its maximum power control level.

The spectrum analyzer setting is as follows.

RBW = 1 MHz

VBW ≥ 3 x RBW

Span ≥ 1.5 x DTS bandwidth

Detector = peak

Sweep time = auto couple

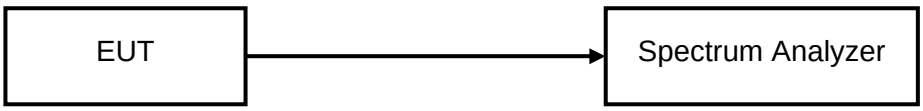
Trace mode = max hold

Allow trace to fully stabilize

The band power measurement function on the spectrum analyzer is used to measure the Maximum peak conducted output power.

7.5 Peak Power Spectral Density

Test Setup



Test Procedure

EUTs Peak Power Spectral Density is measured at low, middle, high channels with a spectrum analyzer connected to the antenna terminal while the EUTs operating at its maximum power control level.

The spectrum analyzer setting is as follows.

Center frequency = DTS channel center frequency

Span = 1.5 times the DTS bandwidth

RBW : 3 kHz ≤RBW ≤ 100 kHz

VBW ≥ 3 x RBW

Detector = peak

Sweep time = auto couple

Trace mode = max hold

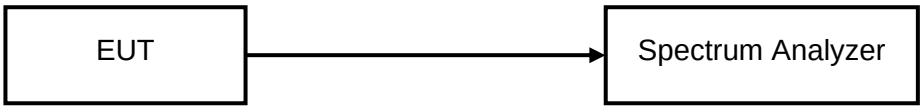
Allow trace to fully stabilize.

The peak marker function on the spectrum analyzer is used to determine the maximum amplitude level within the RBW.

If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

7.6 Conducted Spurious Emissions

Test Setup



Test Procedure

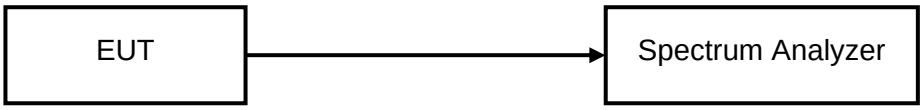
EUTs Conducted spurious emissions are measured at low, middle, high channels with a spectrum analyzer connected to the antenna terminal while the EUTs operating at its maximum power control level. The spectrum analyzer setting is as follows.

1) Reference Level
Center frequency = DTS channel center frequency
Span ≥ 1.5 times the DTS bandwidth
RBW = 100 kHz
VBW ≥ 3 x RBW
Detector = peak
Sweep time = auto couple
Trace mode = max hold
Allow trace to fully stabilize.
The peak marker function on the spectrum analyzer is used to determine the maximum power level in any 100 kHz band segment within the fundamental DTS bandwidth.

2) Unwanted Emissions
Set the center frequency and span to encompass frequency range to be measured.
RBW = 100 kHz
VBW ≥ 3 x RBW
Detector = peak
Ensure that the number of measurement points ≥ span/RBW
Sweep time = auto couple
Trace mode = max hold
Allow trace to fully stabilize.
The peak marker function on the spectrum analyzer is used to determine the maximum amplitude level of all unwanted emissions outside of the authorized frequency band. The unwanted emissions are attenuated by at least the minimum requirements specified.

7.7 Duty Cycle

Test Setup



Test Procedure

EUTs duty cycle are measured at middle channel with a spectrum analyzer connected to the antenna terminal while the EUTs operating at its maximum power control level. The spectrum analyzer setting is as follows.

Center frequency = Center frequency of the transmission
Span = zero
RBW = 8 MHz
VBW = 8 MHz
Detector = peak
Sweep time = 3 ms
Trace mode = veiw
The marker function on the spectrum analyzer is used to determine the duty cycle.

Following the result of the duty cycle measurement according to the above test procedure, the duty cycle was 100 %.

8. TEST DATA

8.1 Conducted Emissions

FCC §15.207, RSS-Gen

2.4 GHz band

Frequency	* Level(dBμV)		** Line	Limit(dBμV)		Margin(dB)	
(MHz)	Q-Peak	Average		Q-Peak	Average	Q-Peak	Average
0.18	53.9	37.5	N	64.5	54.5	10.6	17.0
0.23	46.2	29.1	N	62.4	52.4	16.2	23.3
0.29	40.4	21.4	L	60.5	50.5	20.1	29.1
0.42	38.6	24.2	L	57.4	47.4	18.8	23.2
12.28	43.4	43.1	N	60.0	50.0	16.6	6.9
15.36	36.4	36.2	N	60.0	50.0	23.6	13.8

Line Conducted Emissions Tabulated Data

5 GHz band

Frequency	* Level(dBμV)		** Line	Limit(dBμV)		Margin(dB)	
(MHz)	Q-Peak	Average		Q-Peak	Average	Q-Peak	Average
0.17	54.4	38.2	N	65.0	55.0	10.6	16.8
0.24	46.4	29.4	N	62.1	52.1	15.7	22.7
0.29	42.1	22.5	N	60.5	50.5	18.4	28.0
0.54	37.2	20.5	N	56.0	46.0	18.8	25.5
12.28	44.0	43.8	N	60.0	50.0	16.0	6.2
21.50	30.3	28.8	N	60.0	50.0	29.7	21.2

Line Conducted Emissions Tabulated Data

Note(s):

1. Measurements using CISPR quasi-peak mode & average mode.

2. All modes of operation were investigated and the worst -case emission are reported. See attached Plots.

*3. * Correction factor was included to test level (dBuV)*

*4. ** LINE : L = Line , N = Neutral*

5. The limit is on the FCC Part section 15.207(a).

PLOTS OF EMISSIONS

2.4 GHz mode

- ***Conducted Emission at the Mains port (Line)***

NEMKO KOREA (NK-13-R-125) 31 May 2013 20:07

Conducted Emissions

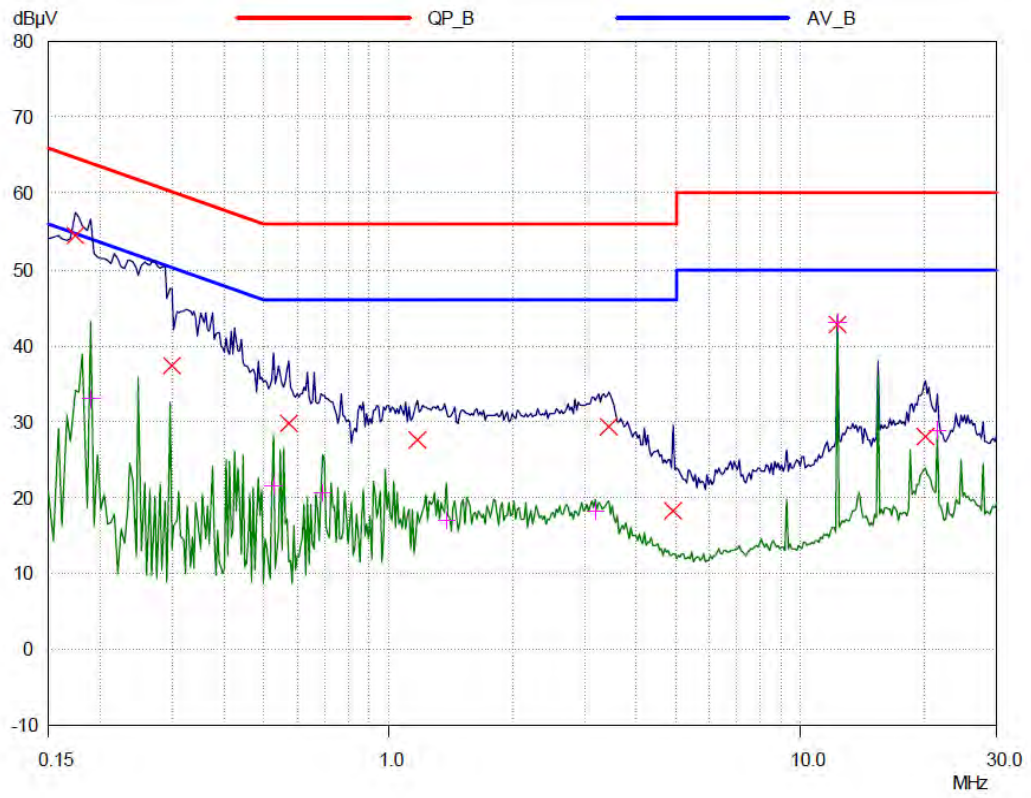
EUT:	Audio transceiver
Manuf:	Samsung Electronics
Op Cond:	a.c. 120 V / 60 Hz (2438 MHz Audio tx mode)
Operator:	Jinha. KO
Test Spec:	FCC Part 15.207
Comment:	MODEL : WIDA10
	LINE : L1

Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150kHz	30MHz	3.9063kHz	9kHz	PK+AV	20msec	20 dB	OFF	60dB

Transducer	No.	Start	Stop	Name
	1	150kHz	30MHz	ESH3_Z5_Line

Final Measurement:		
	Detectors:	X QP / + AV
	Meas Time:	1sec
	Subranges:	8
	Acc Margin:	30 dB



PLOTS OF EMISSIONS

- ***Conducted Emission at the Mains port (Neutral)***

NEMKO KOREA (NK-13-R-125) 31 May 2013 20:17

Conducted Emissions

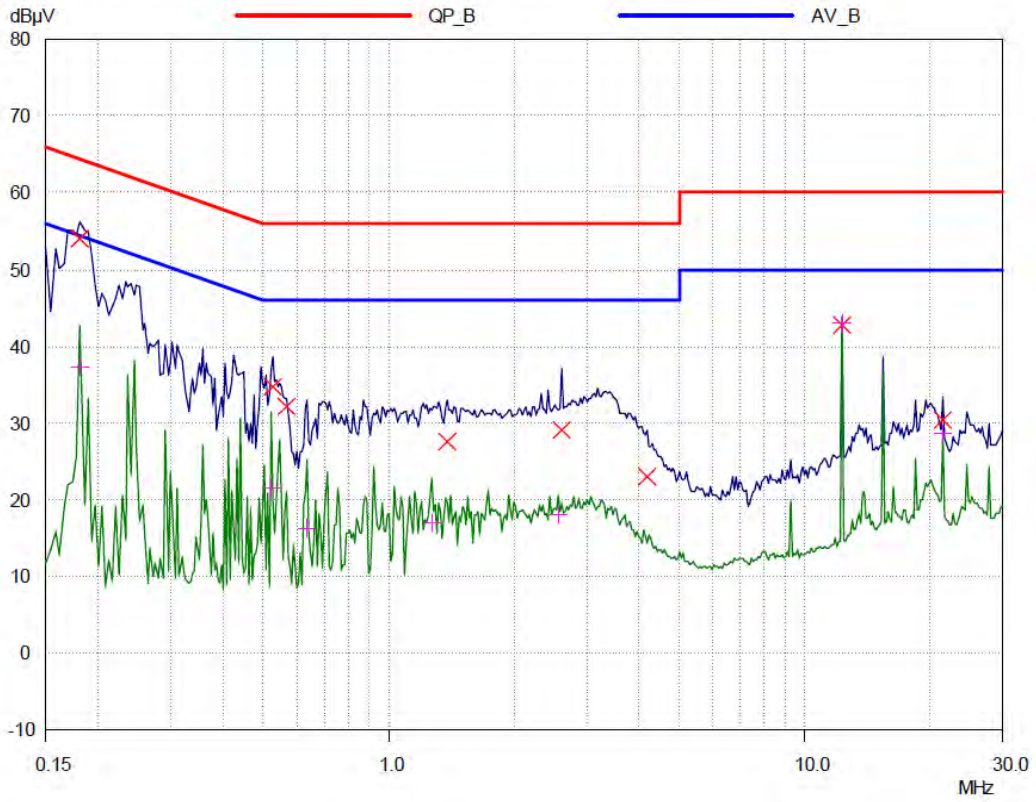
EUT:	Audio transceiver
Manuf:	Samsung Electronics
Op Cond:	a.c. 120 V / 60 Hz (2438 MHz Audio tx mode)
Operator:	Jinha. KO
Test Spec:	FCC Part 15.207
Comment:	MODEL : WIDA10
	LINE : Neutral

Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150kHz	30MHz	3.9063kHz	9kHz	PK+AV	20msec	20 dB	OFF	60dB

Transducer	No.	Start	Stop	Name
	1	150kHz	30MHz	ESH3_Z5_Neutral

Final Measurement:		
	Detectors:	X QP / + AV
	Meas Time:	1sec
	Subranges:	8
	Acc Margin:	30 dB



PLOTS OF EMISSIONS

5.8 GHz mode

- **Conducted Emission at the Mains port (Line)**

NEMKO KOREA (NK-13-R-125) 31 May 2013 20:40

Conducted Emissions

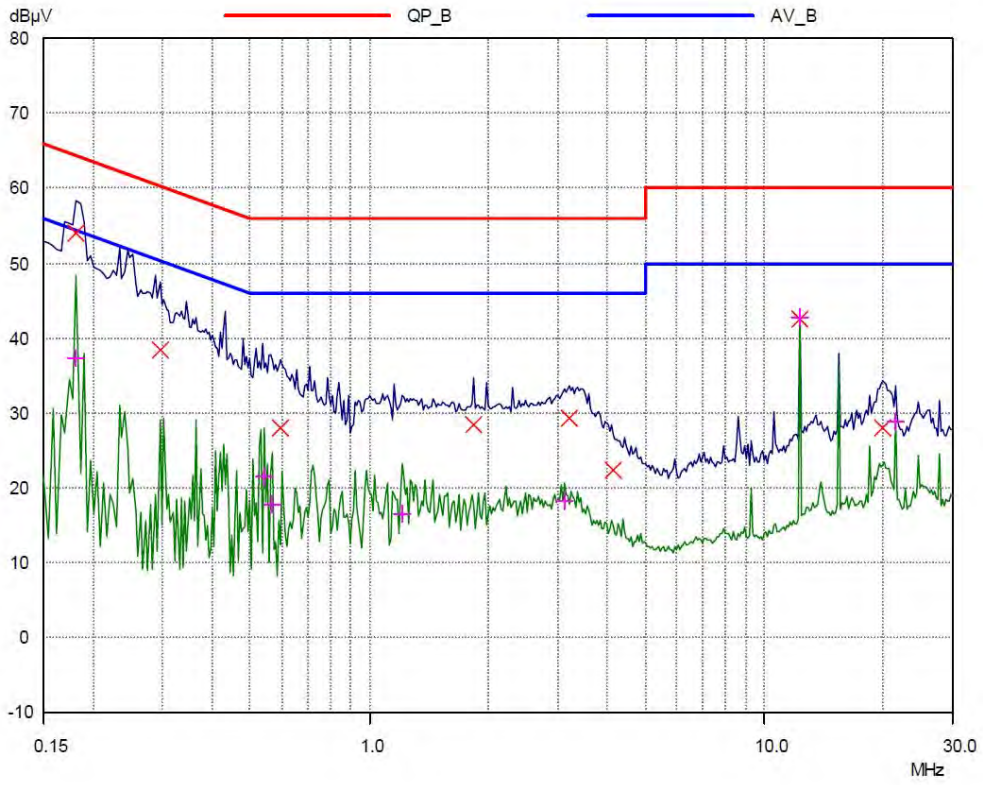
EUT:	Audio transceiver
Manuf:	Samsung Electronics
Op Cond:	a.c. 120 V / 60 Hz (5762 MHz Audio tx mode)
Operator:	Jinha. KO
Test Spec:	FCC Part 15.207
Comment:	MODEL : WIDA10
	LINE : L1

Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150kHz	30MHz	3.9063kHz	9kHz	PK+AV	20msec	20 dB	OFF	60dB

Transducer	No.	Start	Stop	Name
	1	150kHz	30MHz	ESH3_Z5_Line

Final Measurement:		
	Detectors:	X QP / + AV
	Meas Time:	1sec
	Subranges:	8
	Acc Margin:	30 dB



PLOTS OF EMISSIONS

- ***Conducted Emission at the Mains port (Neutral)***

NEMKO KOREA (NK-13-R-125) 31 May 2013 20:26

Conducted Emissions

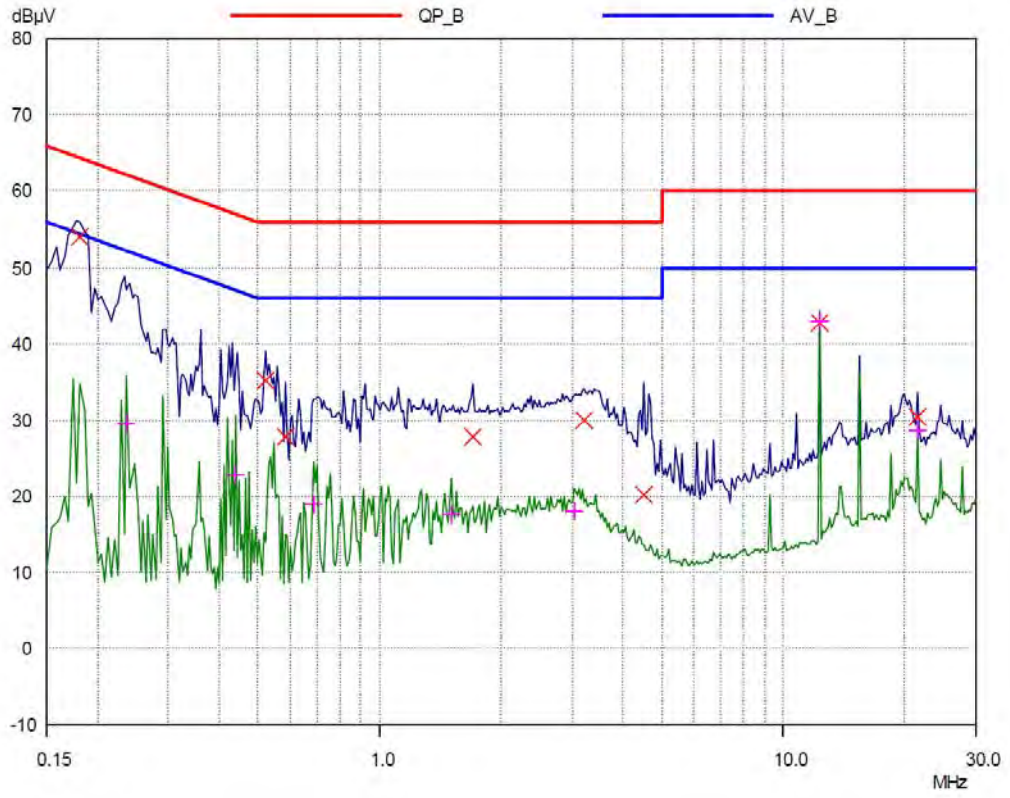
EUT:	Audio transceiver
Manuf:	Samsung Electronics
Op Cond:	a.c. 120 V / 60 Hz (5762 MHz Audio tx mode)
Operator:	Jinha. KO
Test Spec:	FCC Part 15.207
Comment:	MODEL : WIDA10
	LINE : Neutral

Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150kHz	30MHz	3.9063kHz	9kHz	PK+AV	20msec	20 dB	OFF	60dB

Transducer	No.	Start	Stop	Name
	1	150kHz	30MHz	ESH3_Z5_Neutral

Final Measurement:		
	Detectors:	X QP / + AV
	Meas Time:	1sec
	Subranges:	8
	Acc Margin:	30 dB



8.2 Radiated Emissions

FCC §15.209 / IC RSS-210 Issue 8, A8.5

2.4 GHz mode

Frequency (MHz)	Reading (dBµV/m)	Pol* (H/V)	Antenna Heights (cm)	Turntable Angles (°)	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
61.44	41.3	V	122	320	-17.1	24.2	40.0	15.8
144.01	41.5	H	121	14	-17.1	24.4	43.5	19.1
258.05	44.6	H	154	39	-15.5	29.1	46.0	16.9
282.63	44.8	H	171	158	-15.5	29.3	46.0	16.7
307.20	43.8	H	115	124	-13.6	30.2	46.0	15.8
665.47	35.2	V	113	271	-6.5	28.7	46.0	17.3

Radiated Measurements at 3meters

5.8 GHz mode

Frequency (MHz)	Reading (dBµV/m)	Pol* (H/V)	Antenna Heights (cm)	Turntable Angles (°)	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
61.44	41.4	V	125	321	-17.1	24.3	40.0	15.7
228.58	46.8	H	203	311	-19.1	27.7	46.0	18.3
258.05	43.9	H	147	41	-15.5	28.4	46.0	17.6
282.63	45.2	H	170	161	-15.5	29.7	46.0	16.3
307.20	44.0	H	120	123	-13.6	30.4	46.0	15.6
847.88	31.2	V	125	340	-3.4	27.8	46.0	18.2

Radiated Measurements at 3meters

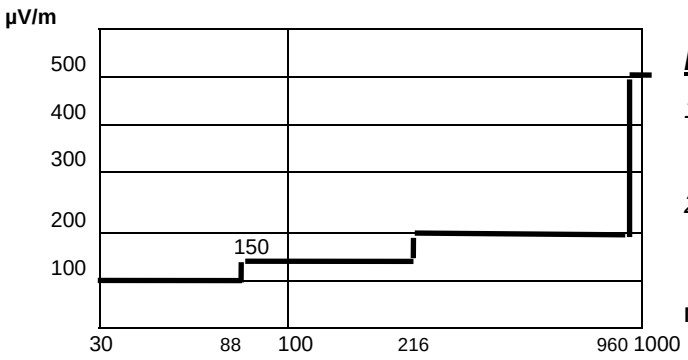


Fig. 3. Limits at 3 meters

Note(s):

1. All modes were measured and the worst-case emission was reported.

2 The radiated limits are shown on Figure 3.

Above 1 GHz the limit is 500 µV/m.

*3. *Pol. H = Horizontal, V = Vertical*

*4. **AF + CL + Amp. = Antenna Factor + Cable Loss + Amplifier.*

5. Measurements using CISPR quasi-peak mode.

8.3 6 dB Modulated Bandwidth

FCC §15.247(a)(2) / IC RSS-210 Issue 8, A8.2

Test Mode : Lowest channel, Middle channel and Highest channel

2.4 GHz band

Ant A

Channel	Frequency(MHz)	Result(kHz)	Limit(kHz)	Margin(kHz)
Low	2412	9839	500	9339
Middle	2438	9839	500	9339
High	2464	9840	500	9340

Ant B

Channel	Frequency(MHz)	Result(kHz)	Limit(kHz)	Margin(kHz)
Low	2412	8939	500	8439
Middle	2438	9839	500	9339
High	2464	9839	500	9339

5.8 GHz band

Ant A

Channel	Frequency(MHz)	Result(kHz)	Limit(kHz)	Margin(kHz)
Low	5736	9837	500	9337
Middle	5762	9835	500	9335
High	5814	9838	500	9338

Ant B

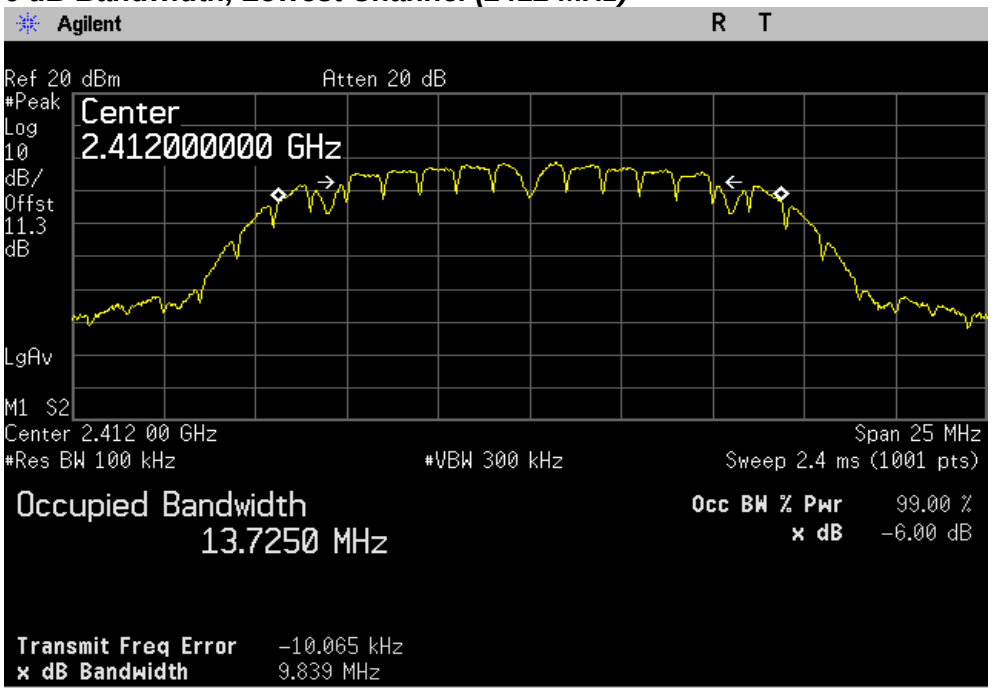
Channel	Frequency(MHz)	Result(kHz)	Limit(kHz)	Margin(kHz)
Low	5736	9836	500	9336
Middle	5762	9838	500	9338
High	5814	9839	500	9339

PLOTS OF EMISSIONS

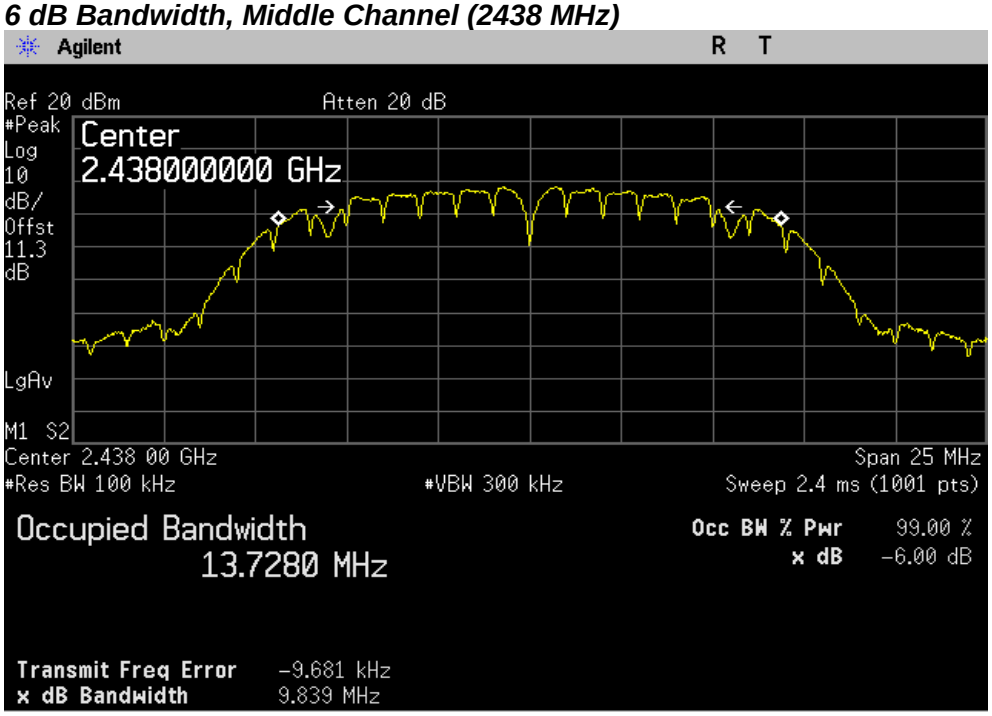
2.4 GHz band

Ant A

6 dB Bandwidth, Lowest Channel (2412 MHz)

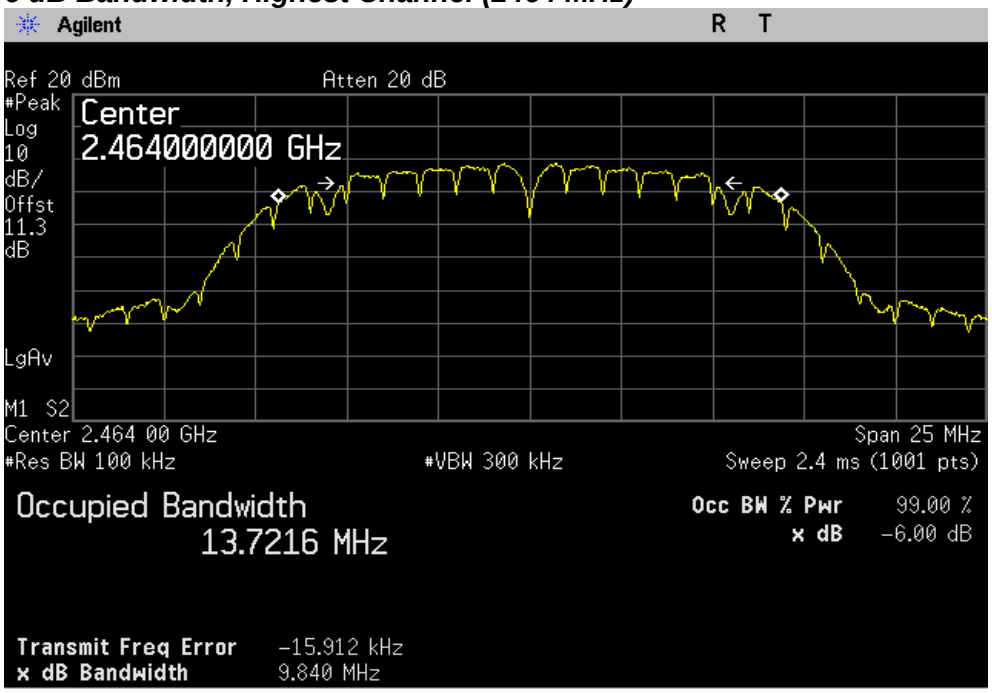


6 dB Bandwidth, Middle Channel (2438 MHz)



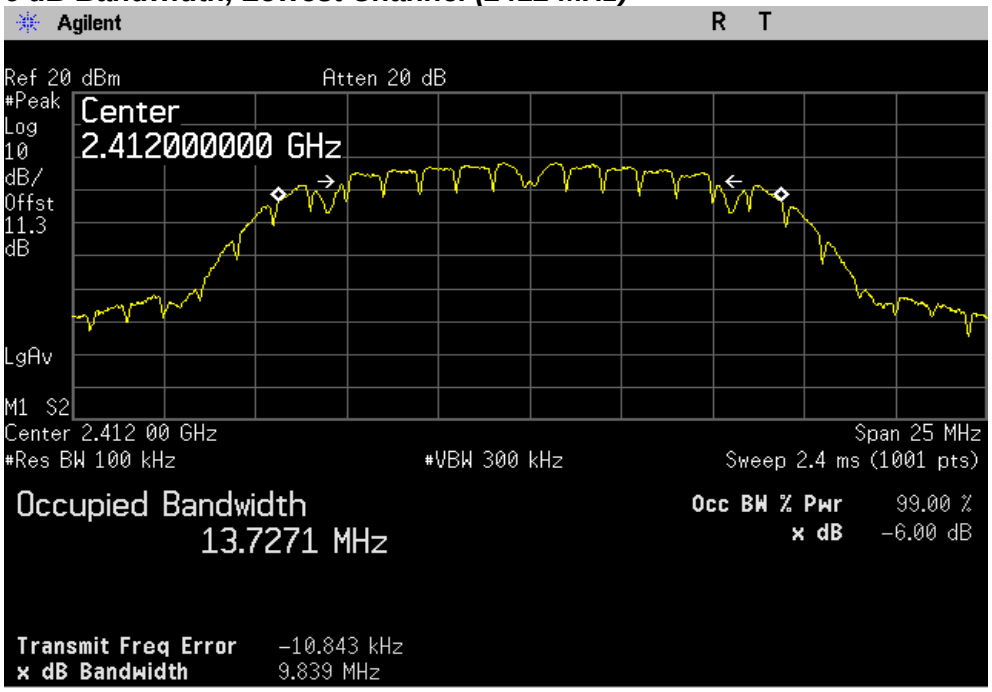
PLOTS OF EMISSIONS

6 dB Bandwidth, Highest Channel (2464 MHz)



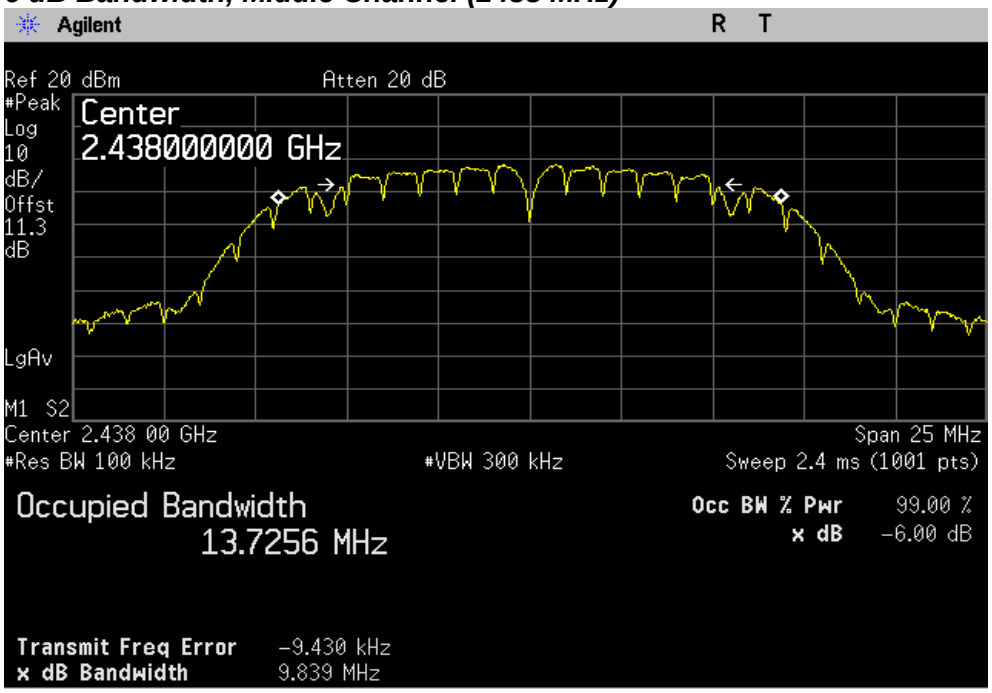
Ant B

6 dB Bandwidth, Lowest Channel (2412 MHz)

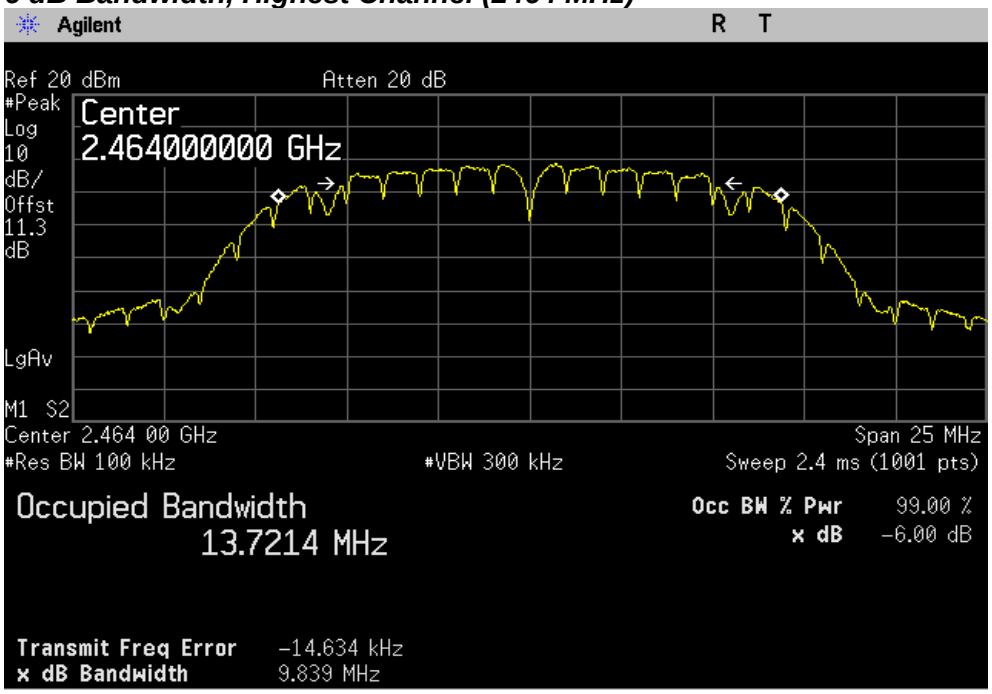


PLOTS OF EMISSIONS

6 dB Bandwidth, Middle Channel (2438 MHz)



6 dB Bandwidth, Highest Channel (2464 MHz)

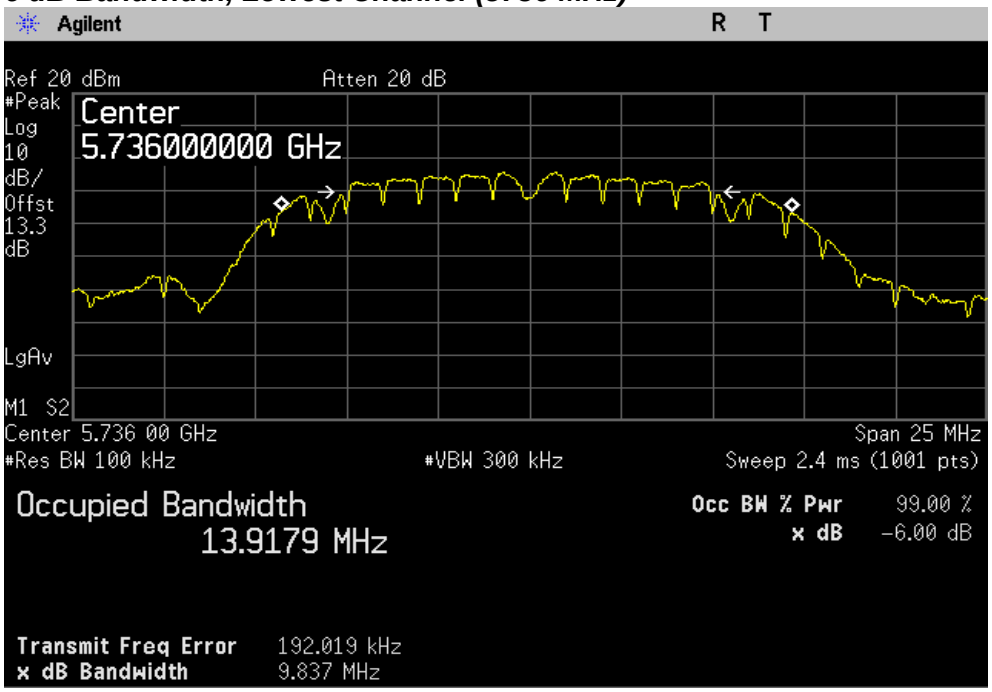


PLOTS OF EMISSIONS

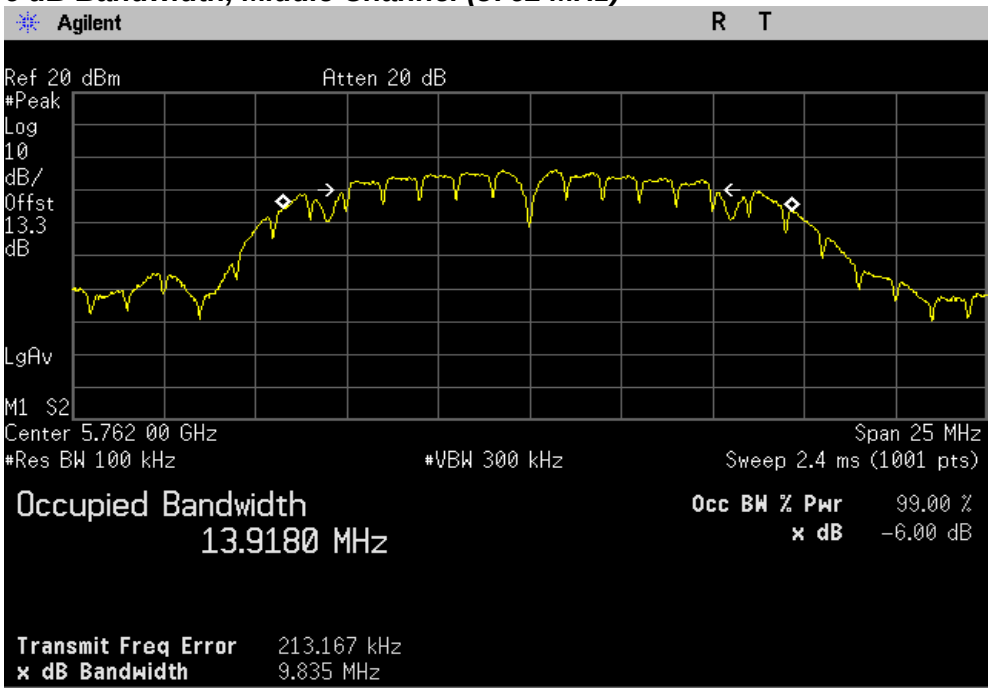
5.8 GHz band

Ant A

6 dB Bandwidth, Lowest Channel (5736 MHz)

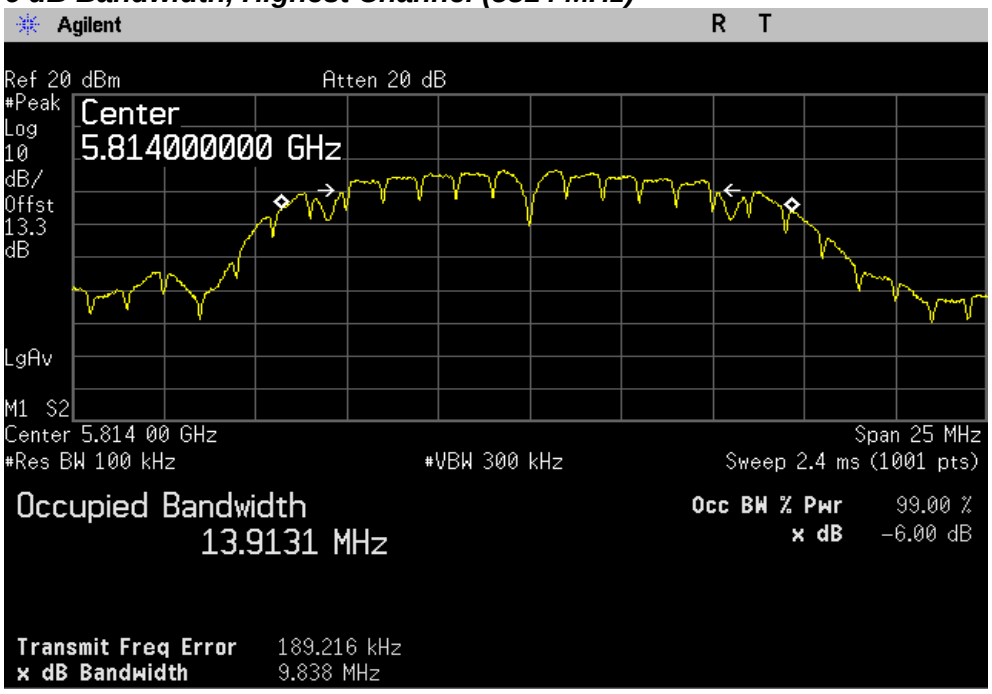


6 dB Bandwidth, Middle Channel (5762 MHz)



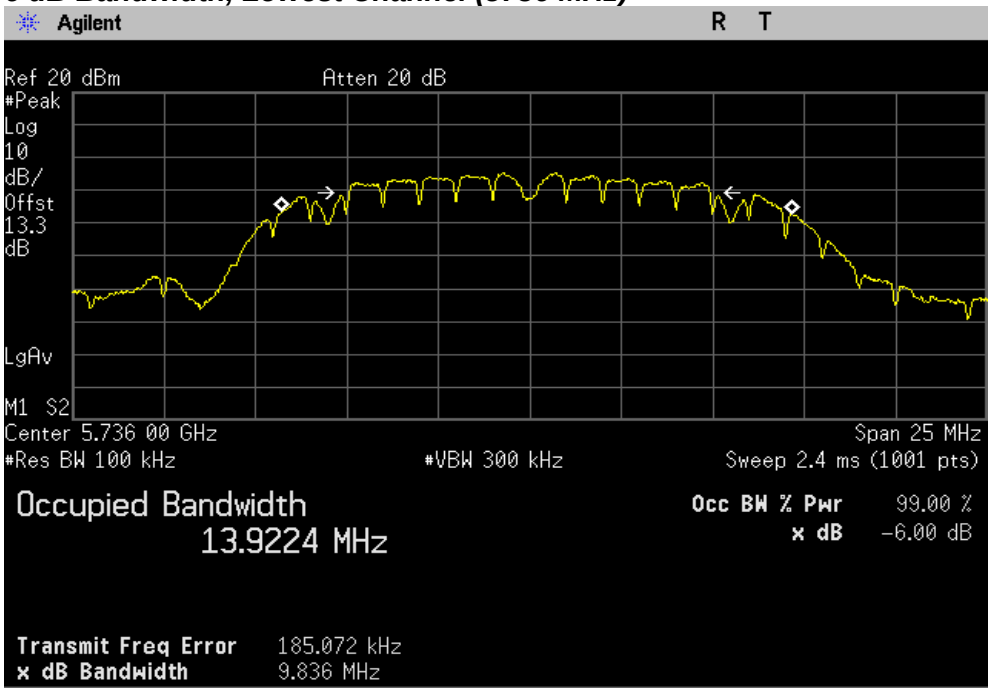
PLOTS OF EMISSIONS

6 dB Bandwidth, Highest Channel (5814 MHz)



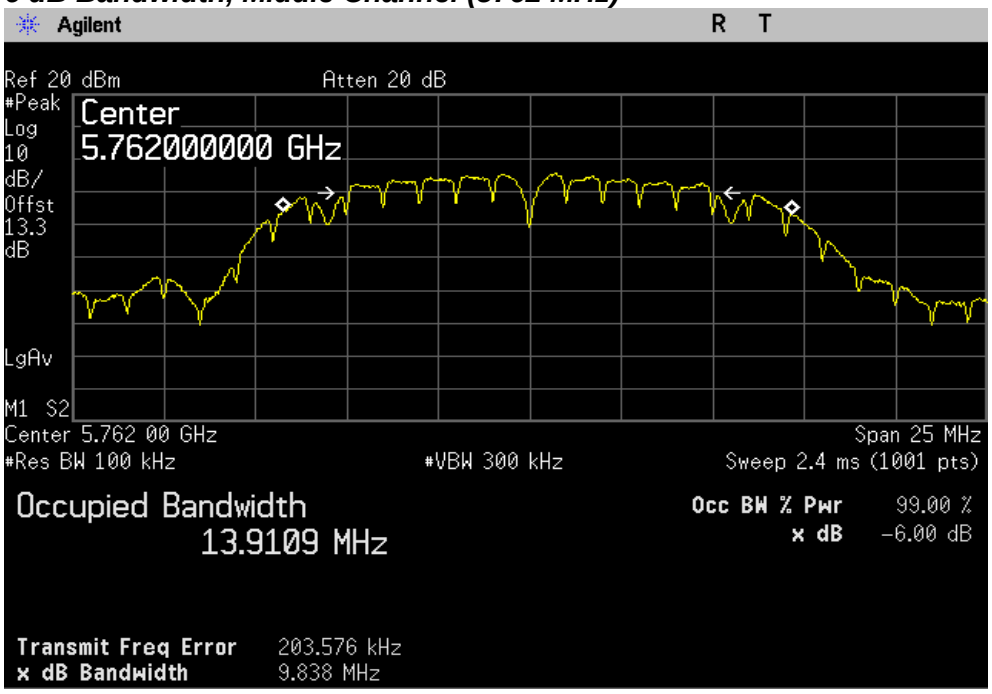
Ant B

6 dB Bandwidth, Lowest Channel (5736 MHz)

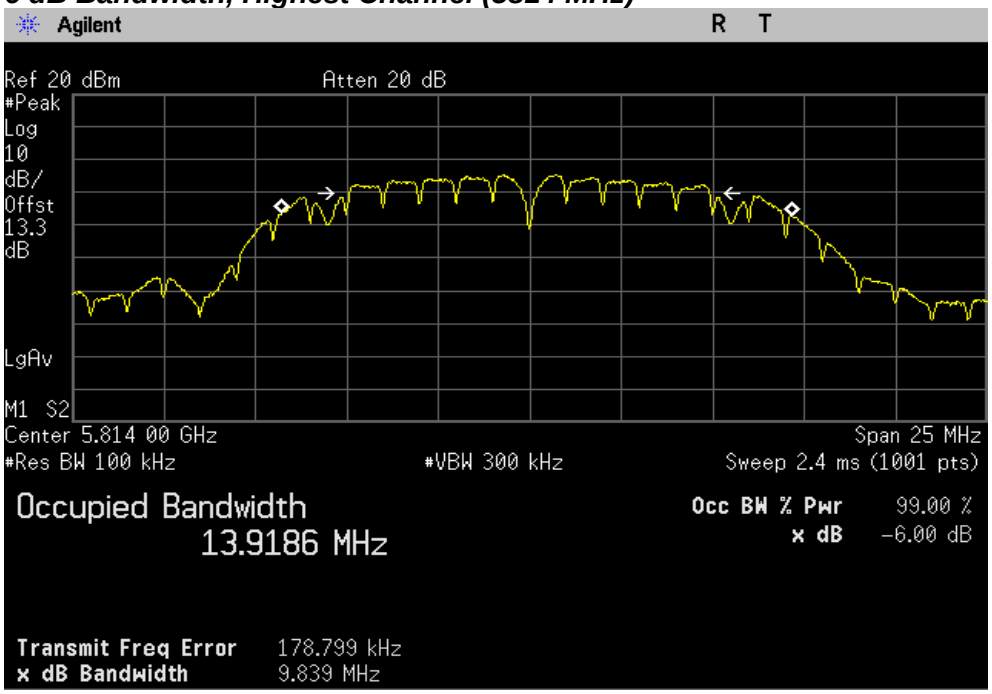


PLOTS OF EMISSIONS

6 dB Bandwidth, Middle Channel (5762 MHz)



6 dB Bandwidth, Highest Channel (5814 MHz)



8.4 Maximum Peak Output Power

FCC §15.247(b)(3) / IC RSS-210 Issue 8, A8.4

Test Mode : Lowest channel, Middle channel and Highest

2.4 GHz band

Ant A

Channel	Frequency (MHz)	Peak Power (dBm)	Limit (dBm)	Margin (dB)
Low	2412	16.08	30.00	13.92
Middle	2438	15.66	30.00	14.34
High	2464	15.93	30.00	14.07

Ant B

Channel	Frequency (MHz)	Peak Power (dBm)	Limit (dBm)	Margin (dB)
Low	2412	16.04	30.00	13.96
Middle	2438	15.65	30.00	14.35
High	2464	15.96	30.00	14.04

5.8 GHz band

Ant A

Channel	Frequency (MHz)	Peak Power (dBm)	Limit (dBm)	Margin (dB)
Low	5736	13.45	30.00	16.55
Middle	5762	13.64	30.00	16.36
High	5814	14.40	30.00	15.60

Ant B

Channel	Frequency (MHz)	Peak Power (dBm)	Limit (dBm)	Margin (dB)
Low	5736	12.84	30.00	17.16
Middle	5762	12.91	30.00	17.09
High	5814	12.60	30.00	17.40

Note(s):

The following equation was used for spectrum offset:

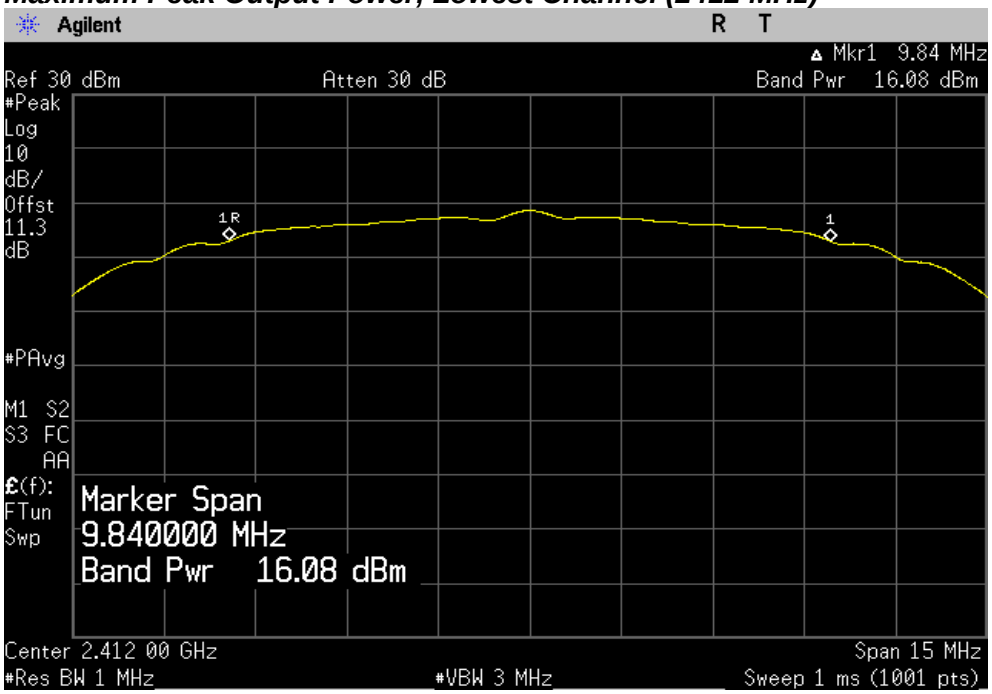
Spectrum offset (dB) = Attenuator (dB) + Cable Loss (dB) + SMA Type Connector Loss (dB)

PLOT OF TEST DATA

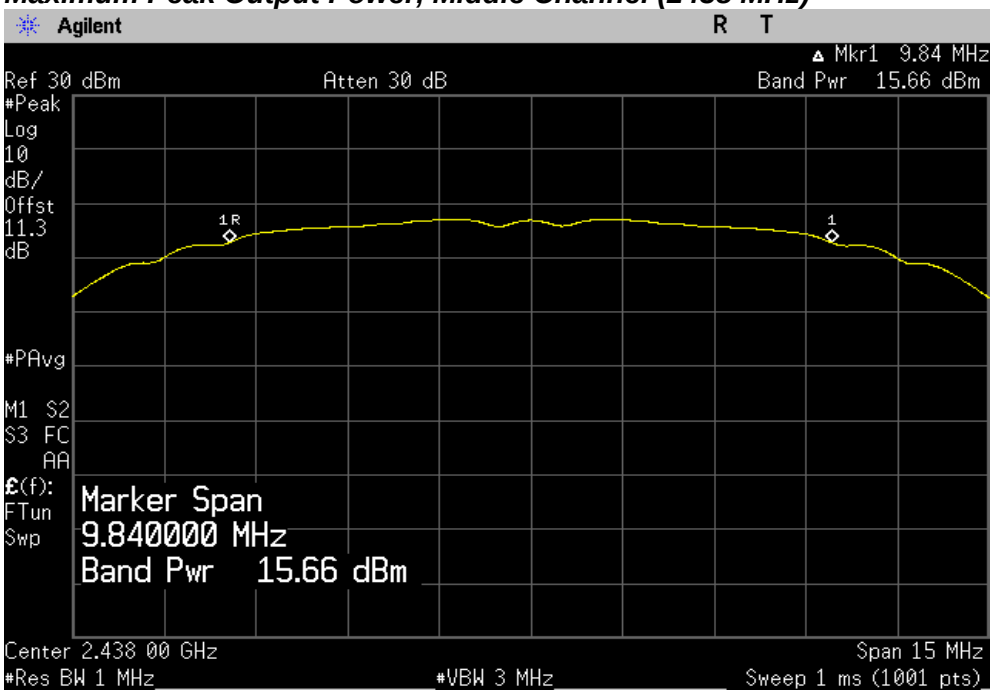
2.4 GHz band

Ant A

Maximum Peak Output Power, Lowest Channel (2412 MHz)

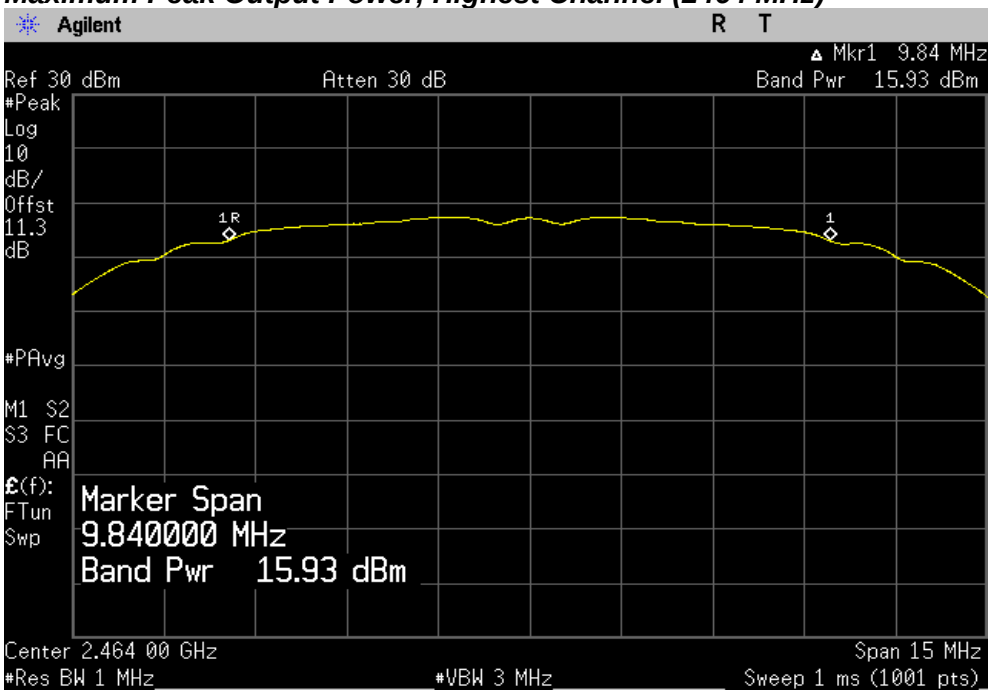


Maximum Peak Output Power, Middle Channel (2438 MHz)



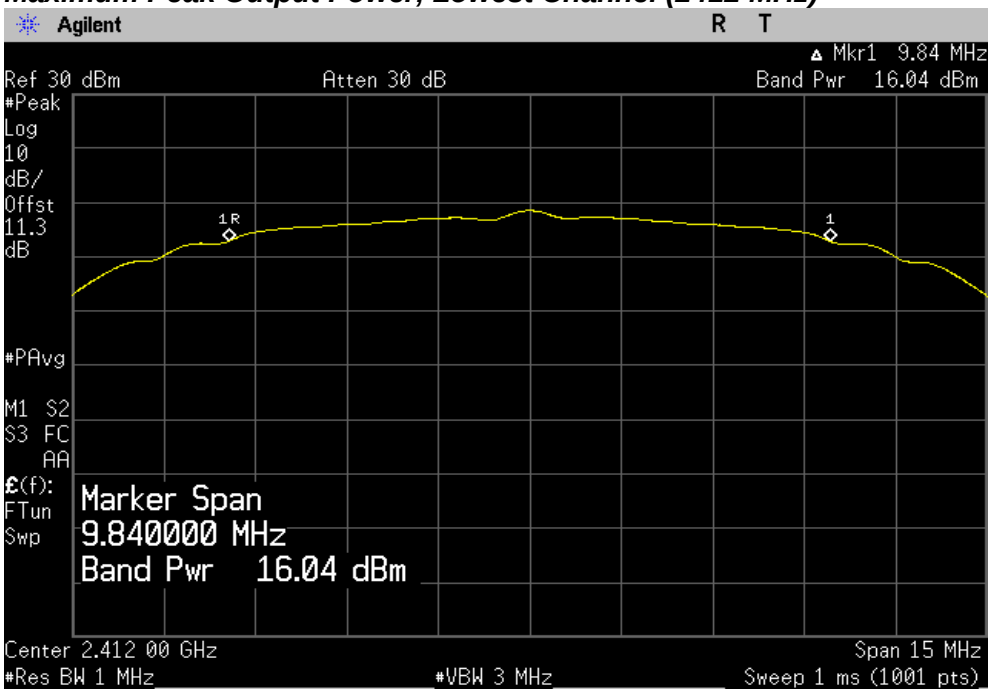
PLOT OF TEST DATA

Maximum Peak Output Power, Highest Channel (2464 MHz)



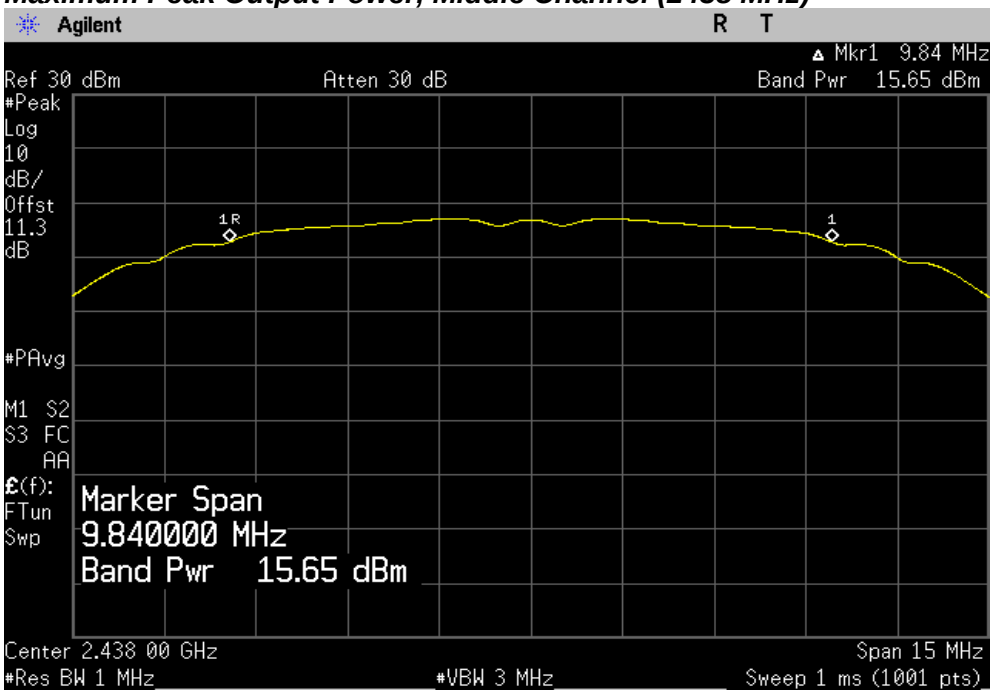
Ant B

Maximum Peak Output Power, Lowest Channel (2412 MHz)

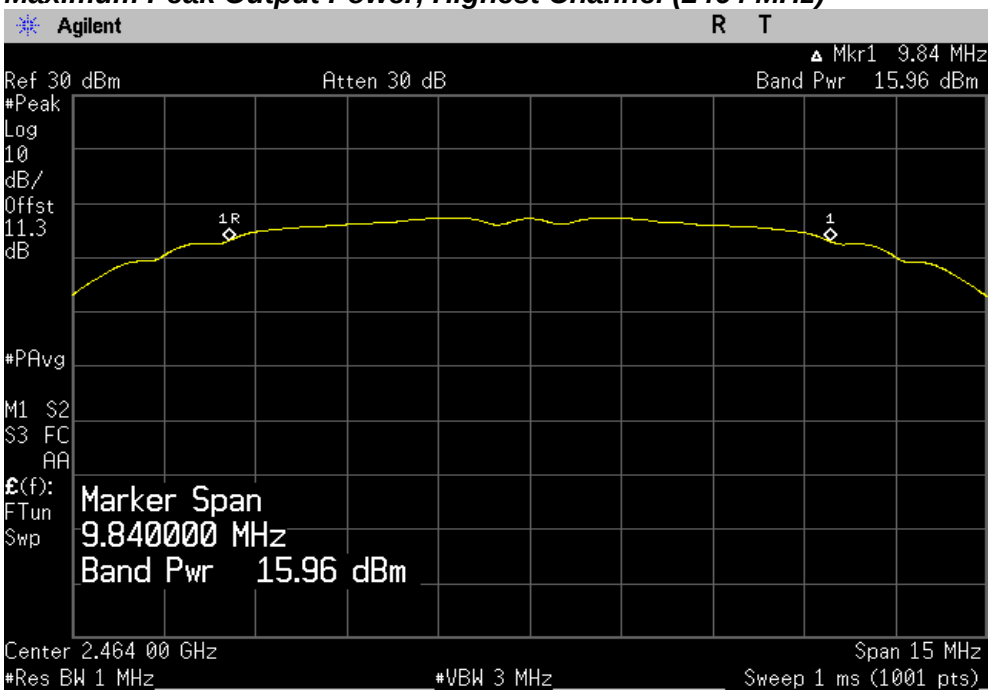


PLOT OF TEST DATA

Maximum Peak Output Power, Middle Channel (2438 MHz)



Maximum Peak Output Power, Highest Channel (2464 MHz)

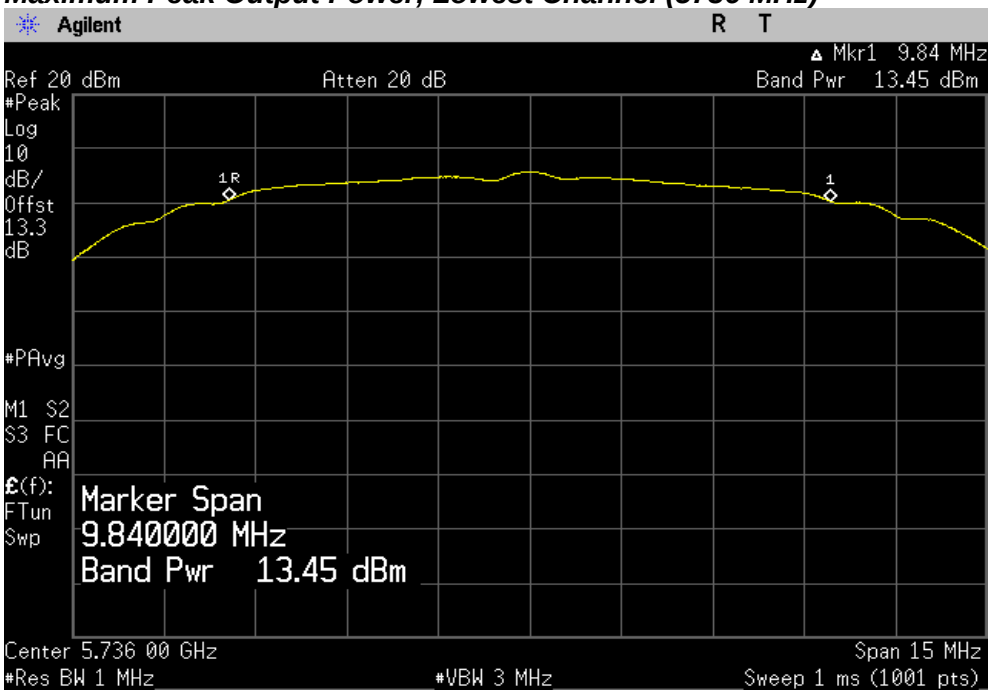


PLOT OF TEST DATA

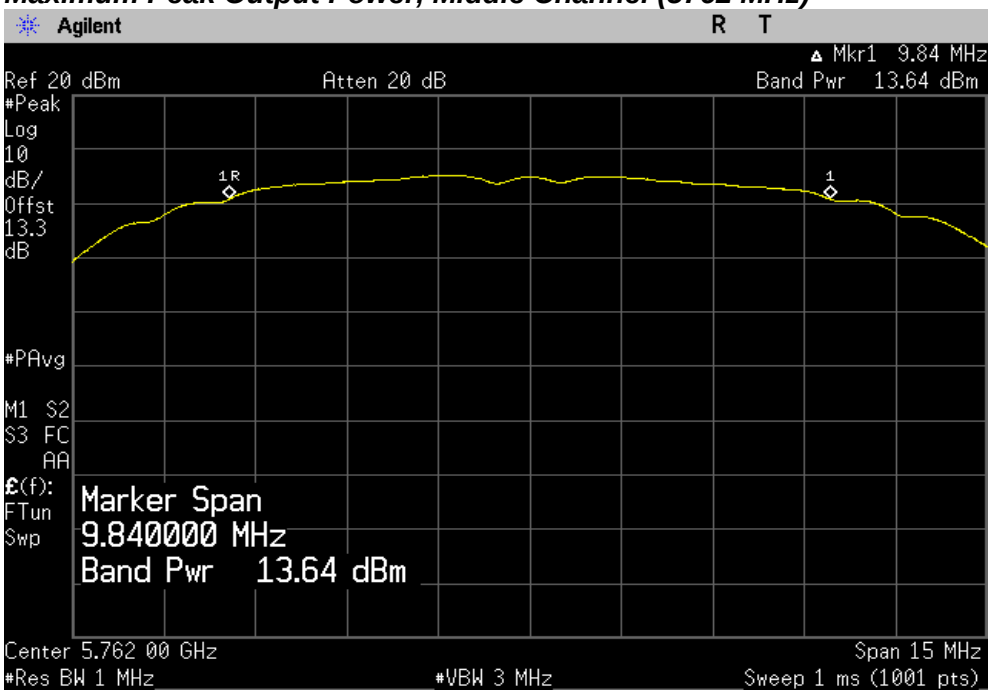
5.8 GHz band

Ant A

Maximum Peak Output Power, Lowest Channel (5736 MHz)

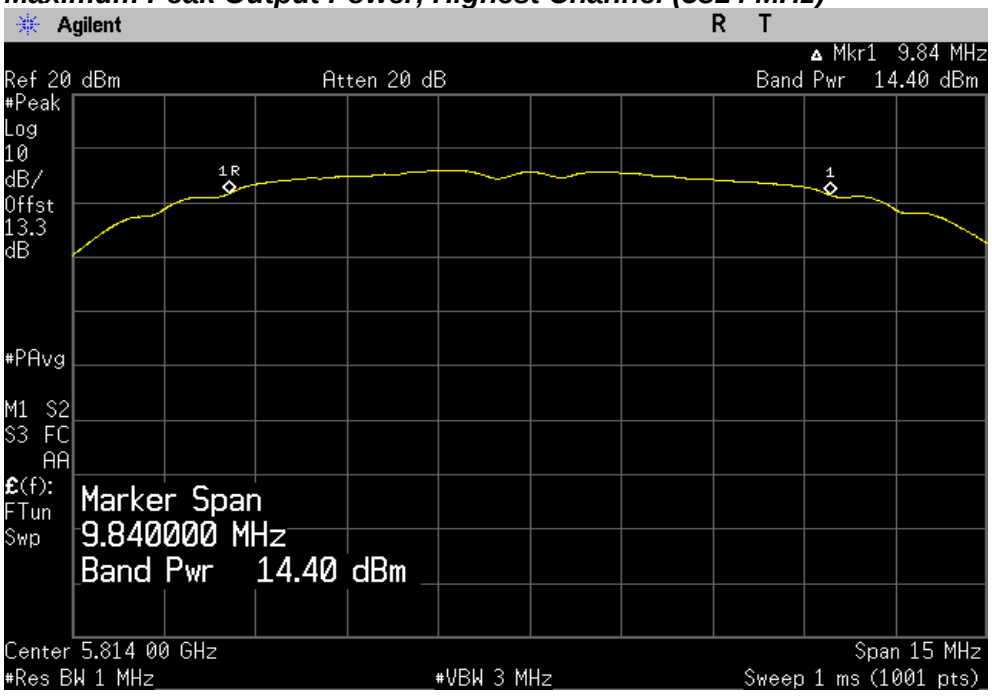


Maximum Peak Output Power, Middle Channel (5762 MHz)



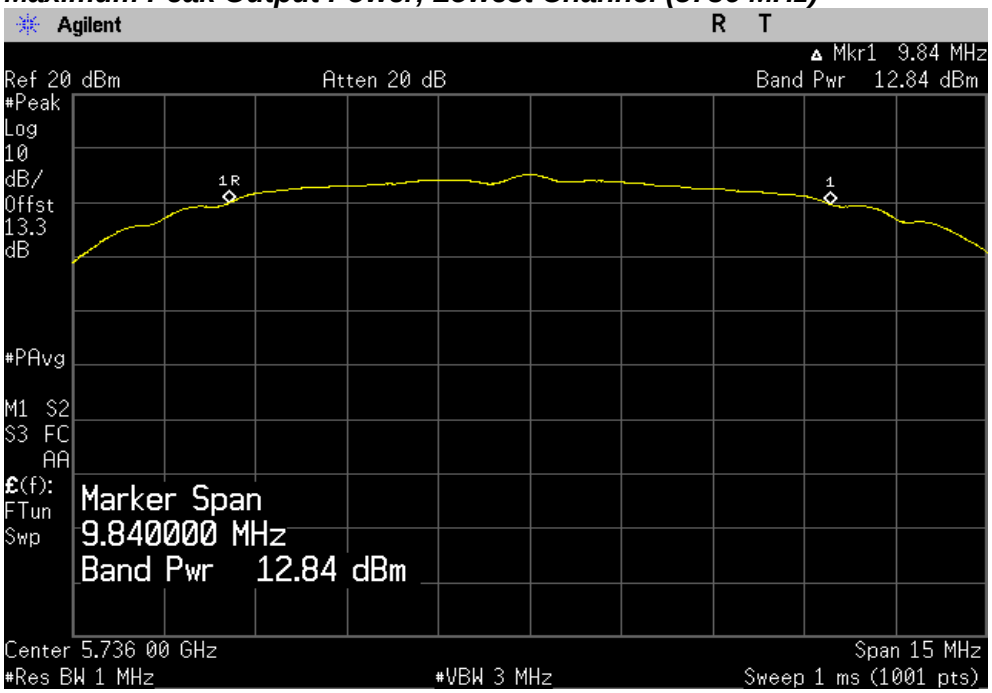
PLOT OF TEST DATA

Maximum Peak Output Power, Highest Channel (5814 MHz)



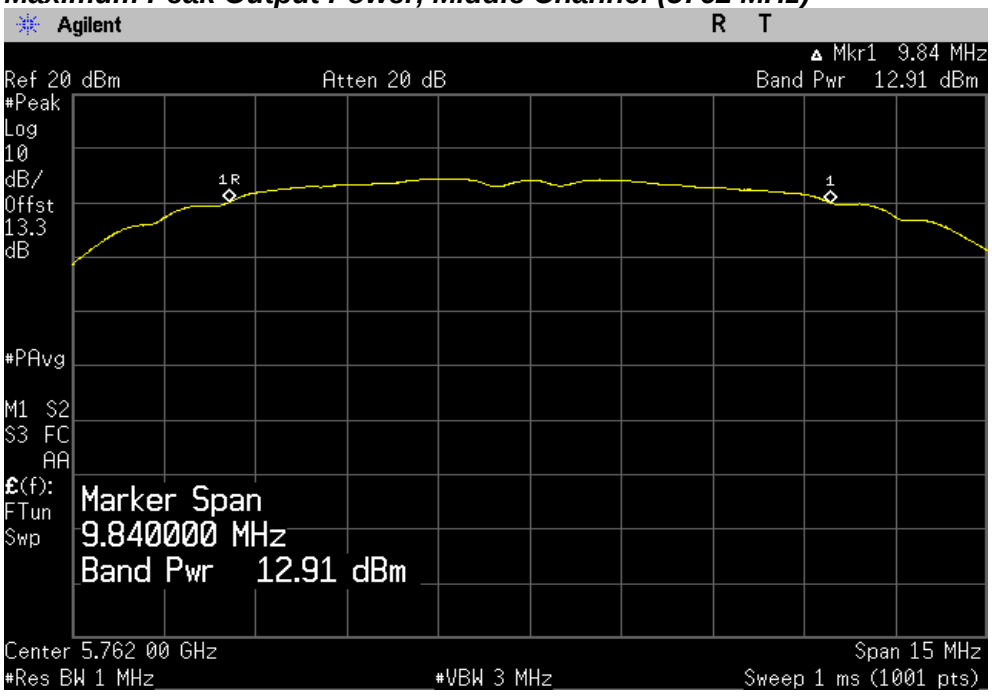
Ant B

Maximum Peak Output Power, Lowest Channel (5736 MHz)

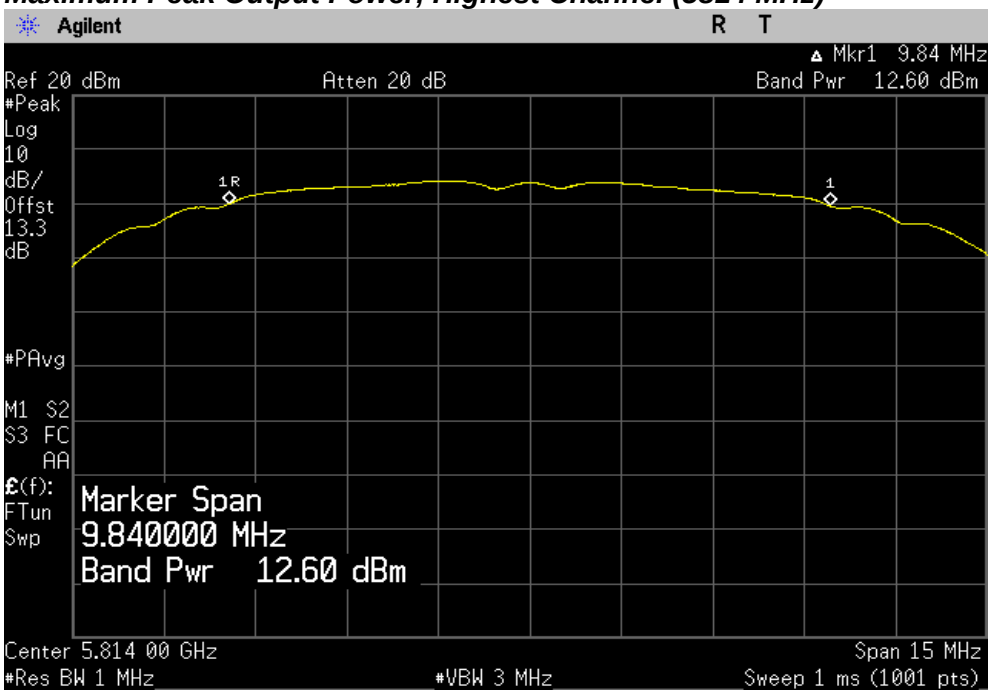


PLOT OF TEST DATA

Maximum Peak Output Power, Middle Channel (5762 MHz)



Maximum Peak Output Power, Highest Channel (5814 MHz)



8.5 Power Spectral Density

FCC §15.247(e) / IC RSS-210 Issue 8, A8.2

Test Mode : Lowest channel, Middle channel and Highest channel

2.4 GHz band

Ant A

Channel	Frequency (MHz)	Measured Power Spectral Density (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-1.43	8	9.43
Middle	2438	-1.60	8	9.60
High	2464	-1.32	8	9.32

Ant B

Channel	Frequency (MHz)	Measured Power Spectral Density (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-1.55	8	9.55
Middle	2438	-1.66	8	9.66
High	2464	-1.34	8	9.34

5.8 GHz band

Ant A

Channel	Frequency (MHz)	Measured Power Spectral Density (dBm)	Limit (dBm)	Margin (dB)
Low	5736	-3.90	8	11.90
Middle	5762	-3.56	8	11.56
High	5814	-2.70	8	10.70

Ant B

Channel	Frequency (MHz)	Measured Power Spectral Density (dBm)	Limit (dBm)	Margin (dB)
Low	5736	-4.14	8	12.14
Middle	5762	-3.76	8	11.76
High	5814	-3.31	8	11.31

Note(s):

The following equation was used for spectrum offset for Power Spectral Density:

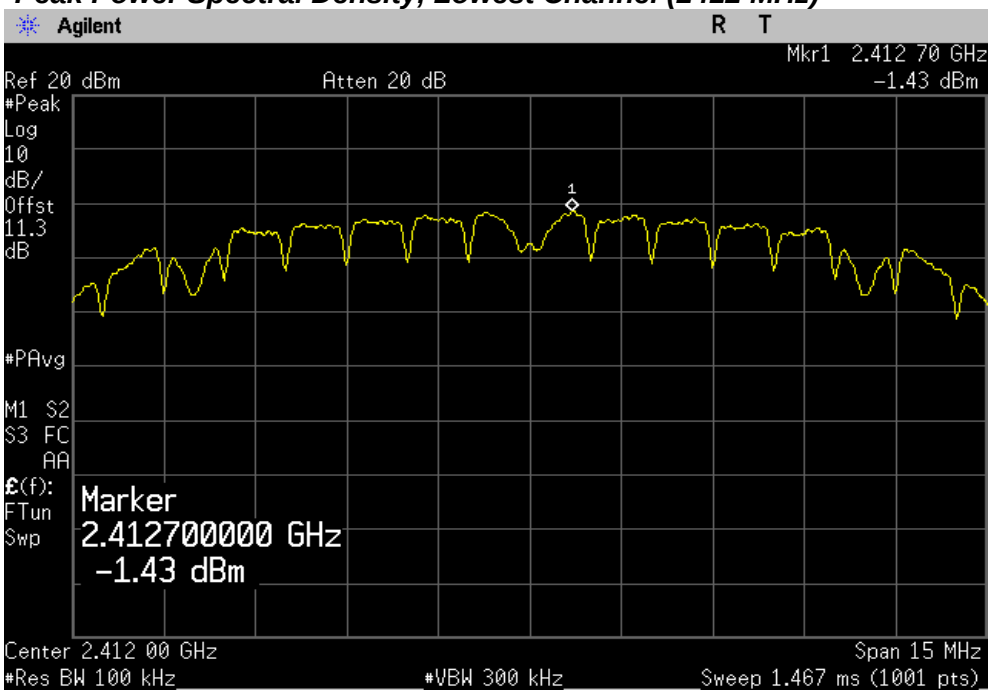
Spectrum offset (dB) = Attenuator (dB) + Cable Loss (dB) + SMA Type Connector Loss (dB)

PLOT OF TEST DATA

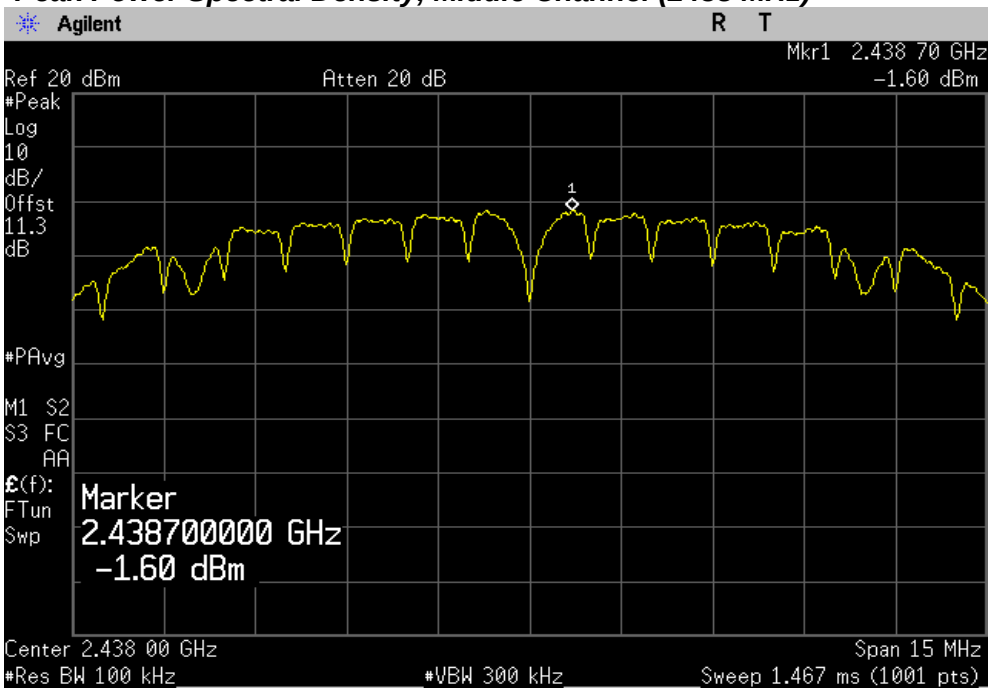
2.4 GHz band

Ant A

Peak Power Spectral Density, Lowest Channel (2412 MHz)

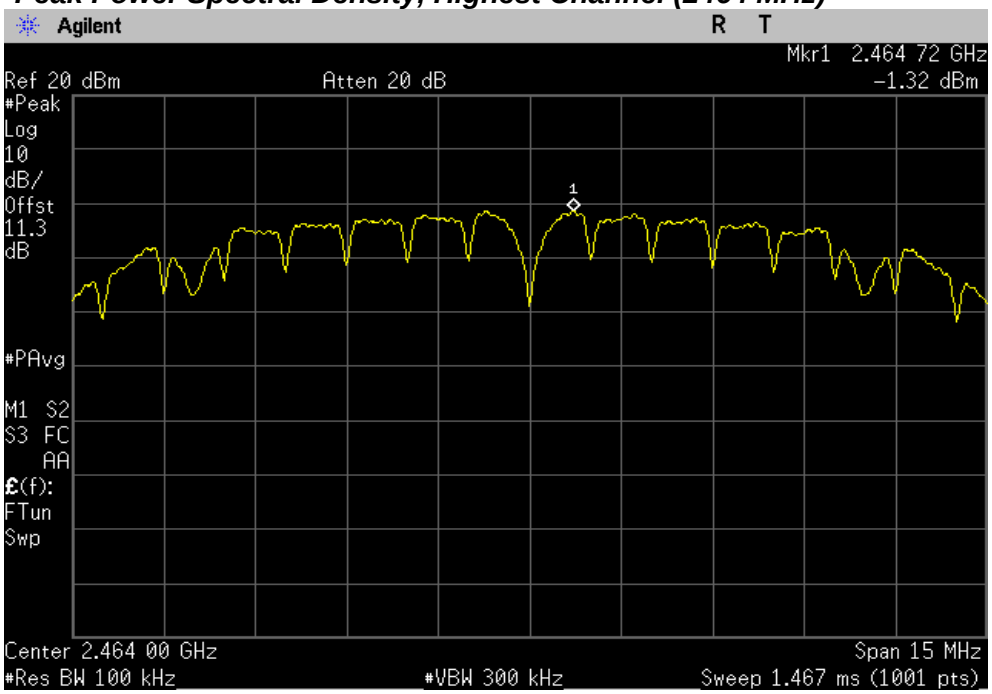


Peak Power Spectral Density, Middle Channel (2438 MHz)



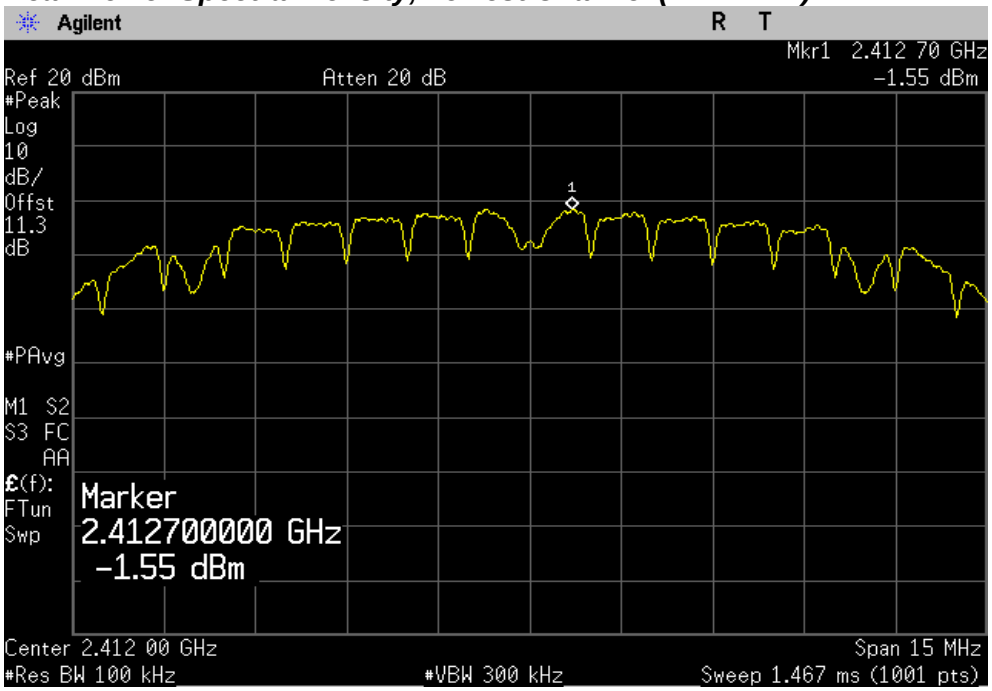
PLOT OF TEST DATA

Peak Power Spectral Density, Highest Channel (2464 MHz)



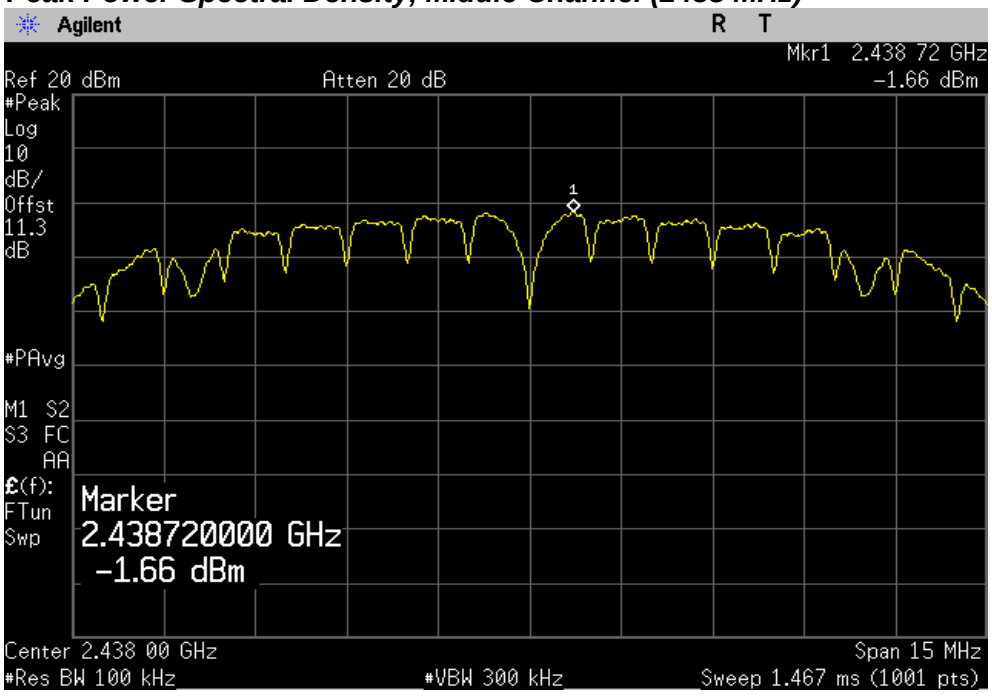
Ant B

Peak Power Spectral Density, Lowest Channel (2412 MHz)

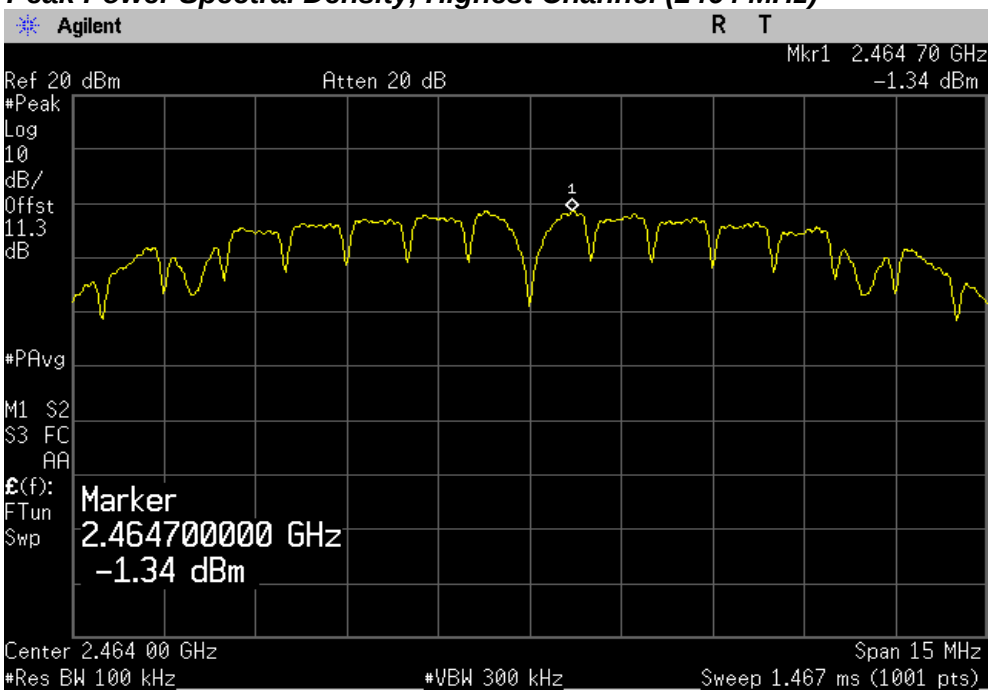


PLOT OF TEST DATA

Peak Power Spectral Density, Middle Channel (2438 MHz)



Peak Power Spectral Density, Highest Channel (2464 MHz)

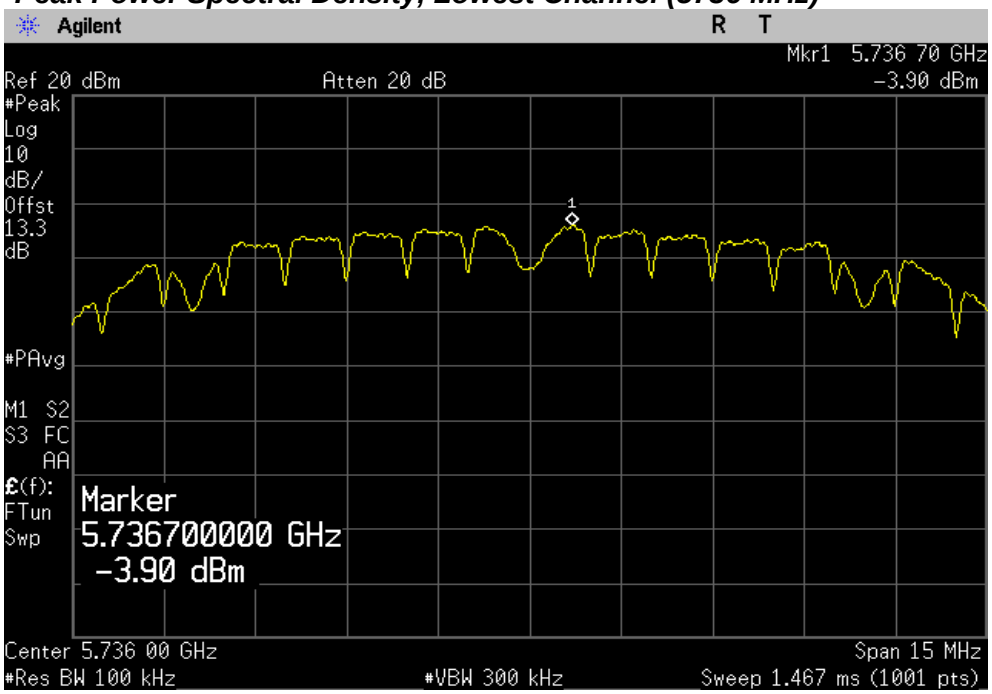


PLOT OF TEST DATA

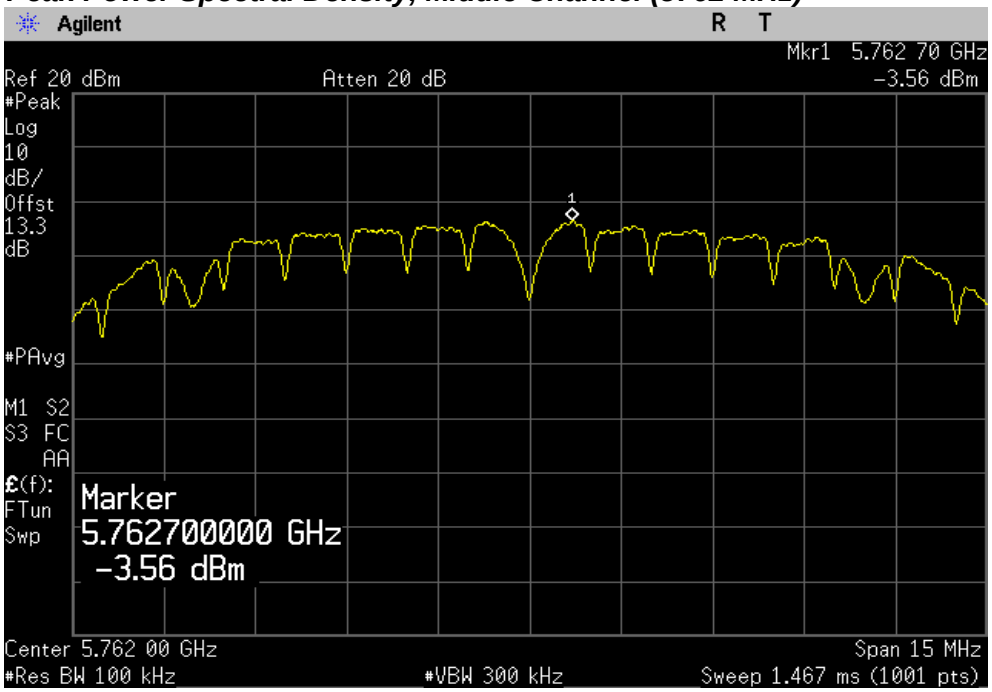
5.8 GHz band

Ant A

Peak Power Spectral Density, Lowest Channel (5736 MHz)

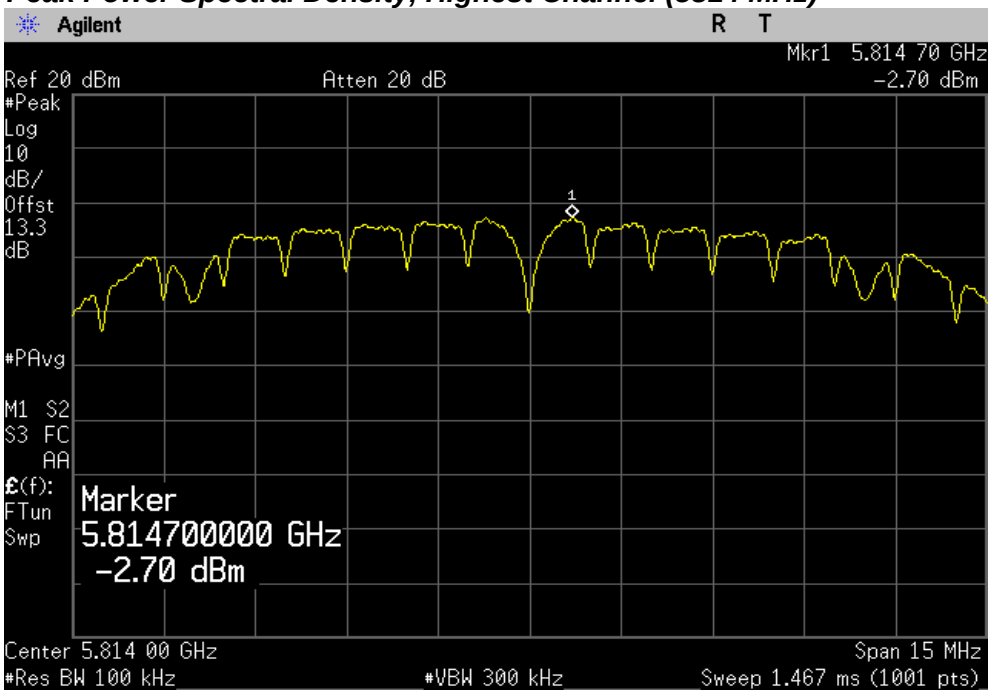


Peak Power Spectral Density, Middle Channel (5762 MHz)



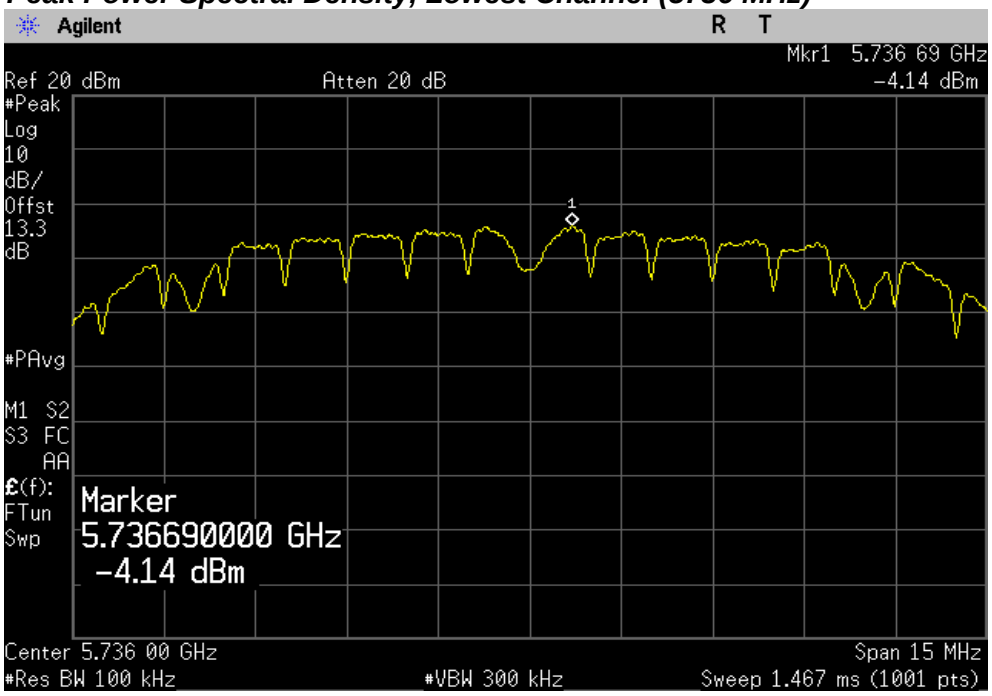
PLOT OF TEST DATA

Peak Power Spectral Density, Highest Channel (5814 MHz)



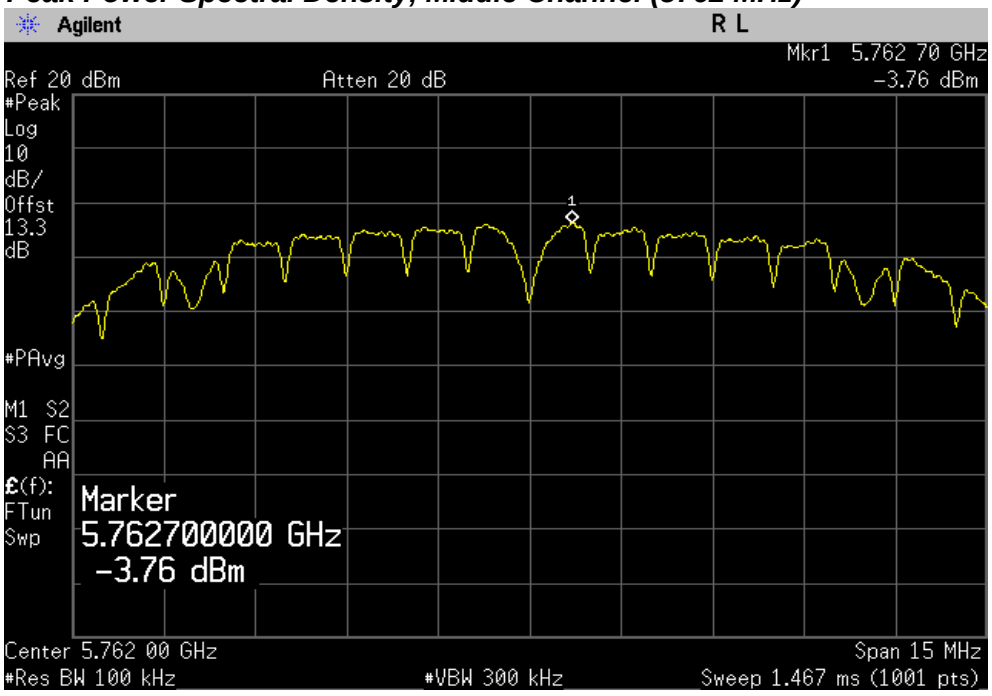
Ant B

Peak Power Spectral Density, Lowest Channel (5736 MHz)

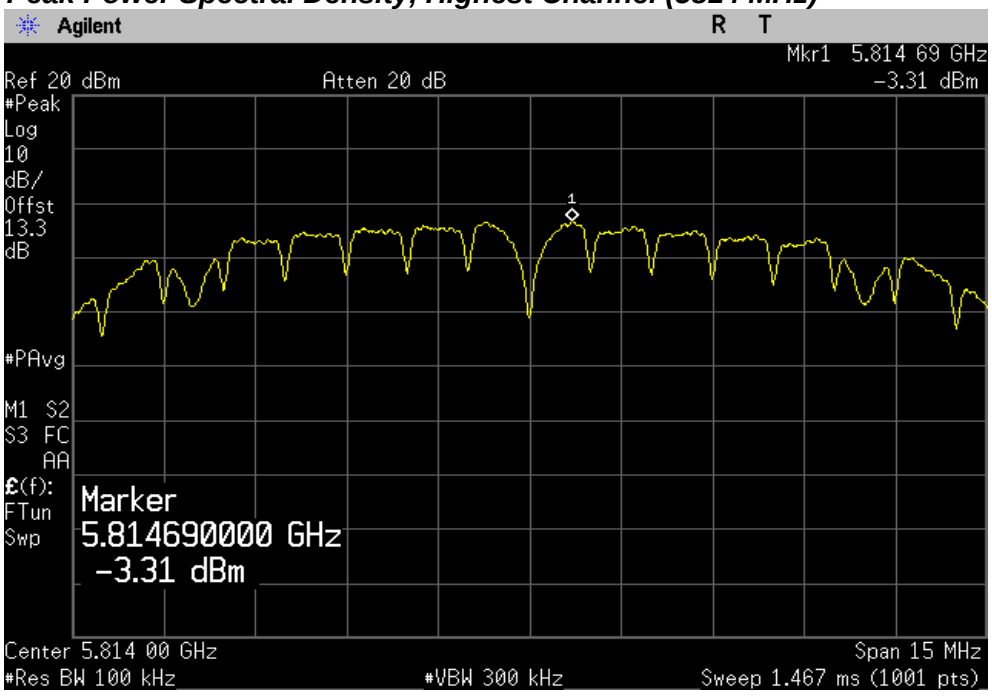


PLOT OF TEST DATA

Peak Power Spectral Density, Middle Channel (5762 MHz)



Peak Power Spectral Density, Highest Channel (5814 MHz)



8.6 Conducted Spurious Emissions

FCC §15.247(d) / IC RSS-210 Issue 8, A8.5

Test Mode: Lowest channel, Middle channel and Highest channel

2.4 GHz band

Ant A and Ant B

Channel	Frequency(MHz)	Result(dBc)	Limit(dBc)
Low	2412	More than 20 dBc	20
Middle	2438	More than 20 dBc	20
High	2464	More than 20 dBc	20

5.8 GHz band

Ant A and Ant B

Channel	Frequency(MHz)	Result(dBc)	Limit(dBc)
Low	5736	More than 20 dBc	20
Middle	5762	More than 20 dBc	20
High	5814	More than 20 dBc	20

Note(s):

1. The cable and attenuator loss from 30 MHz to 40 GHz was reflected in spectrum analyzer with correction factor for the spurious emissions test.

2. RBW was set to 1 MHz rather than 100 kHz in order to increase the test span.

3. The display line shown in the following plots indicates the limit at 20 dB below the fundamental emission level measured in a 100 kHz bandwidth.

4. For plots showing conducted spurious emissions near the limit, the frequencies were investigated with a reduced RBW to ensure that no emissions were present.

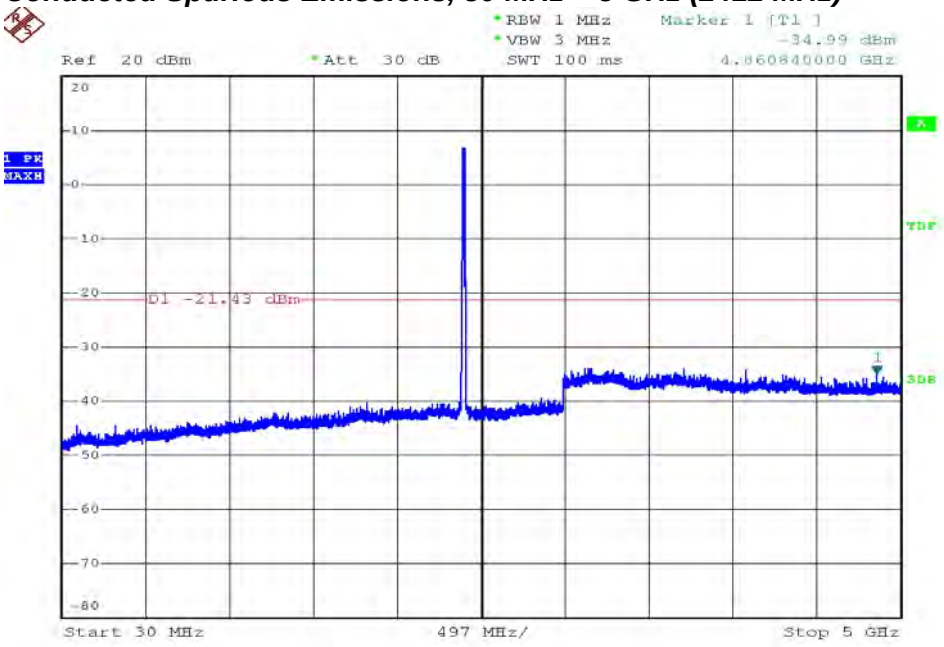
5. During the test, the sweep point was set 8001 for the conducted spurious emissions test and 1001 for the Band Edge test.

PLOT OF TEST DATA

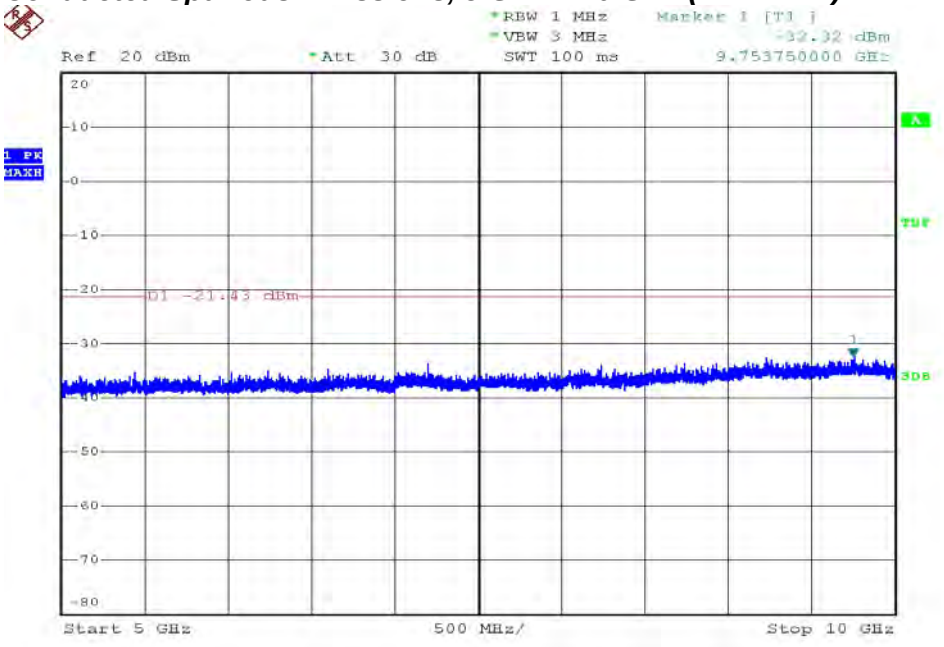
2.4 GHz band

Ant A

Conducted Spurious Emissions, 30 MHz ~ 5 GHz (2412 MHz)

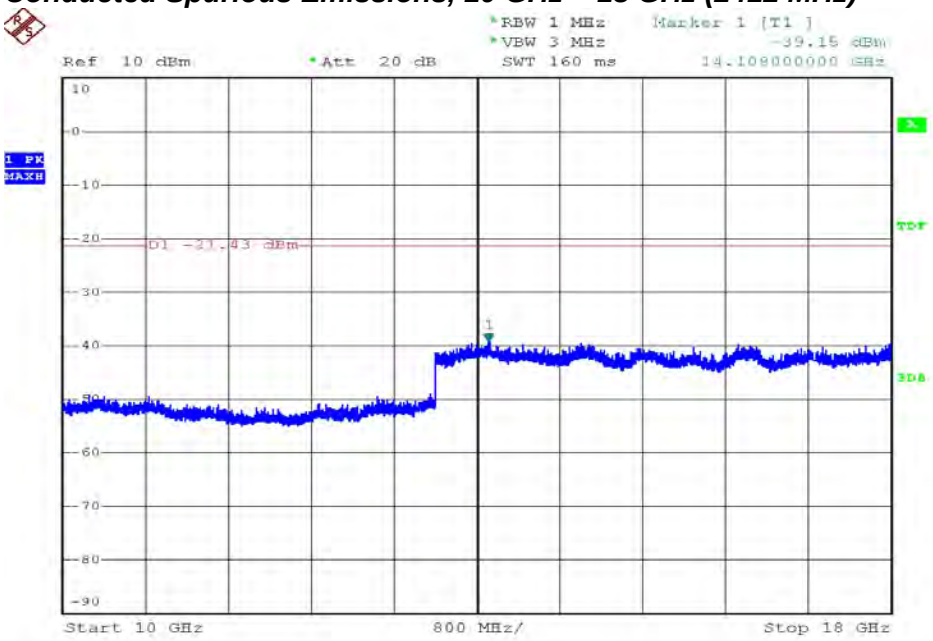


Conducted Spurious Emissions, 5 GHz ~ 10 GHz (2412 MHz)

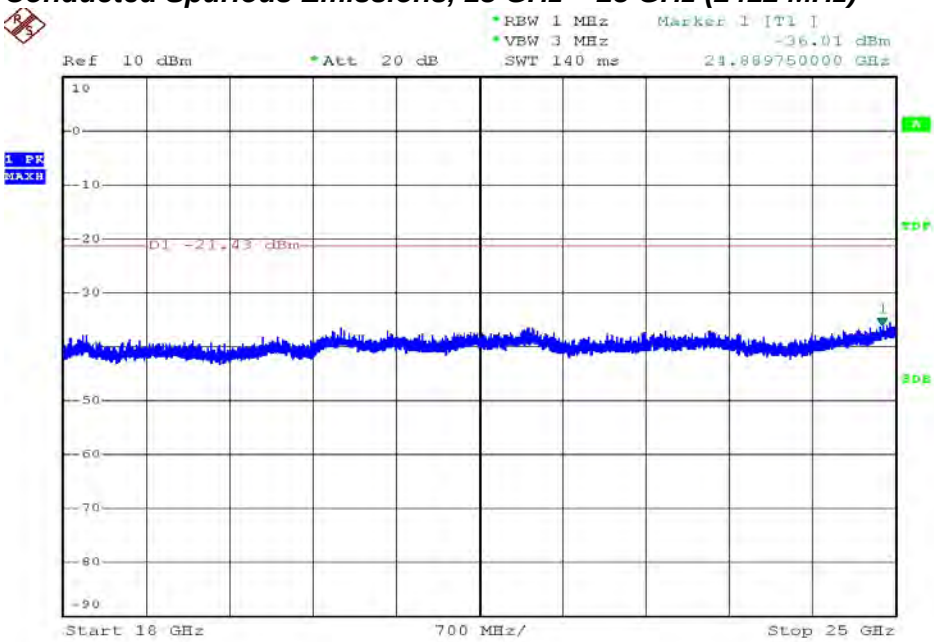


PLOT OF TEST DATA

Conducted Spurious Emissions, 10 GHz ~ 18 GHz (2412 MHz)

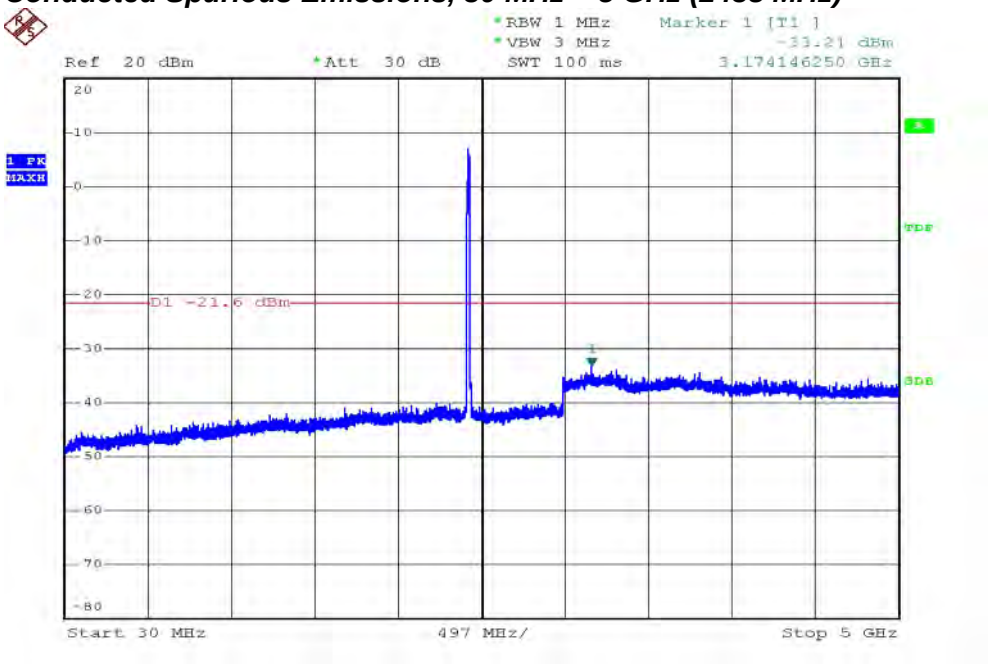


Conducted Spurious Emissions, 18 GHz ~ 25 GHz (2412 MHz)

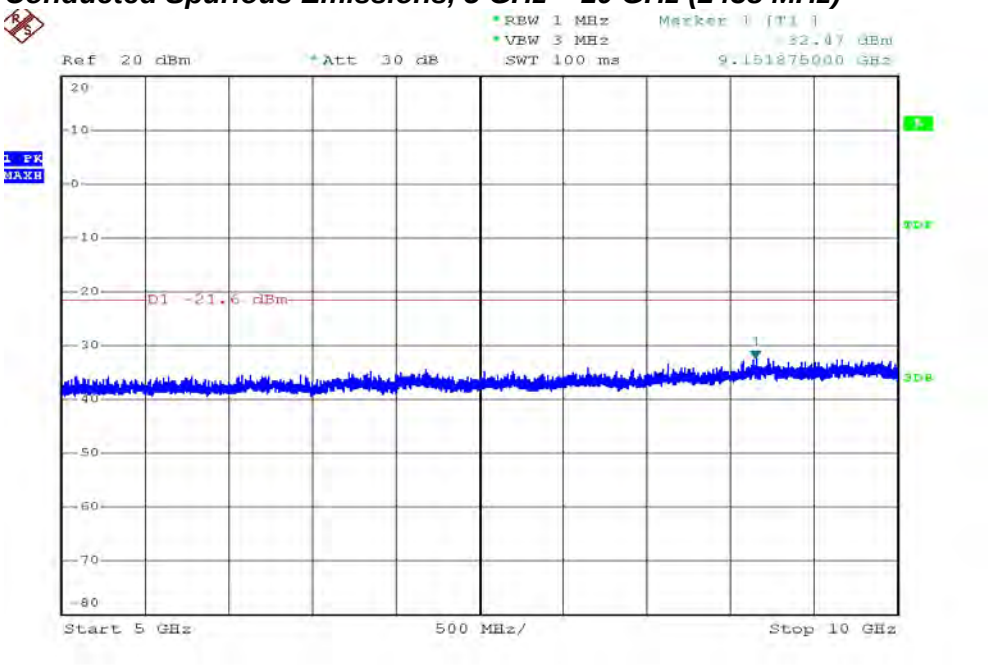


PLOT OF TEST DATA

Conducted Spurious Emissions, 30 MHz ~ 5 GHz (2438 MHz)

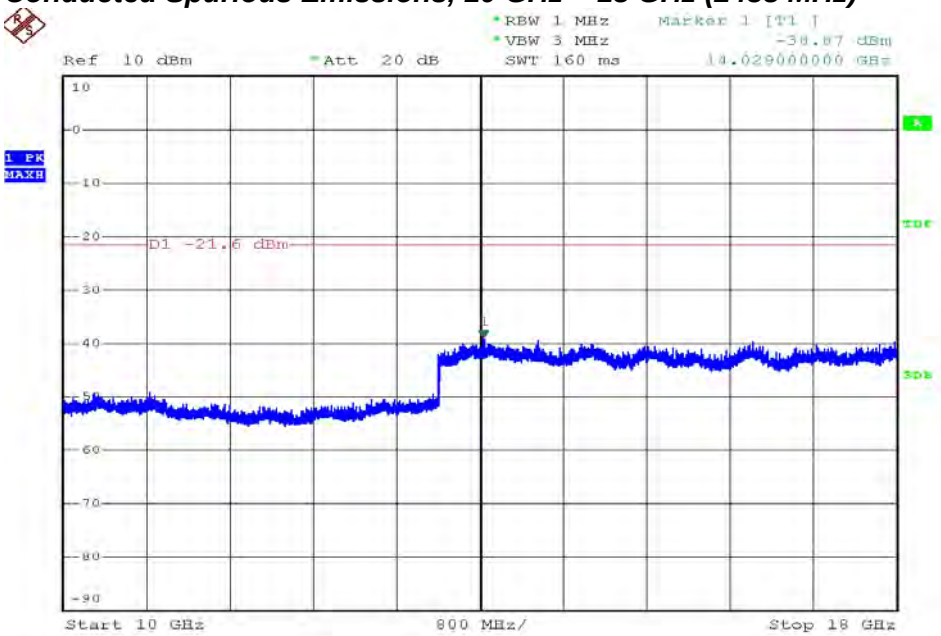


Conducted Spurious Emissions, 5 GHz ~ 10 GHz (2438 MHz)

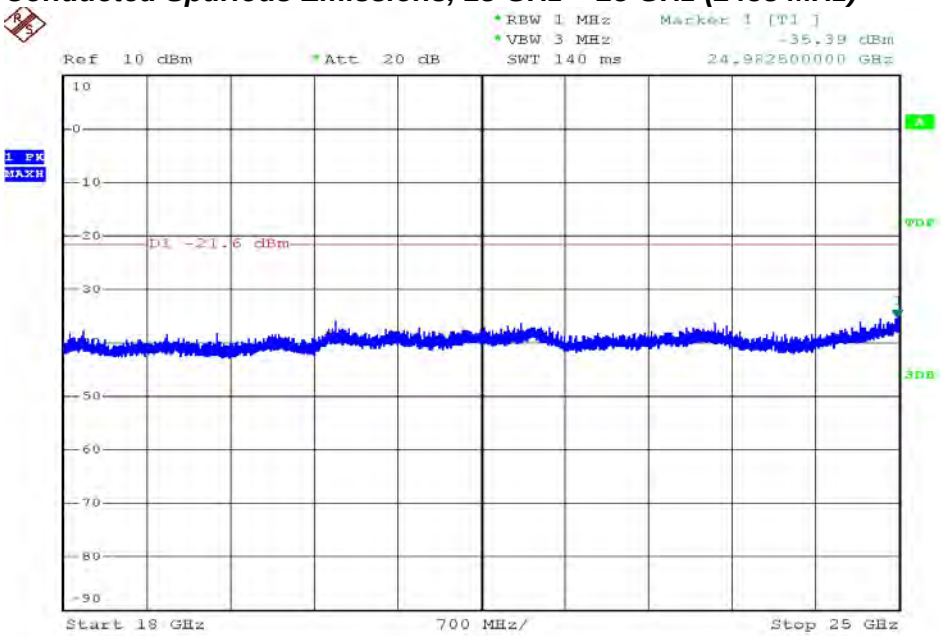


PLOT OF TEST DATA

Conducted Spurious Emissions, 10 GHz ~ 18 GHz (2438 MHz)

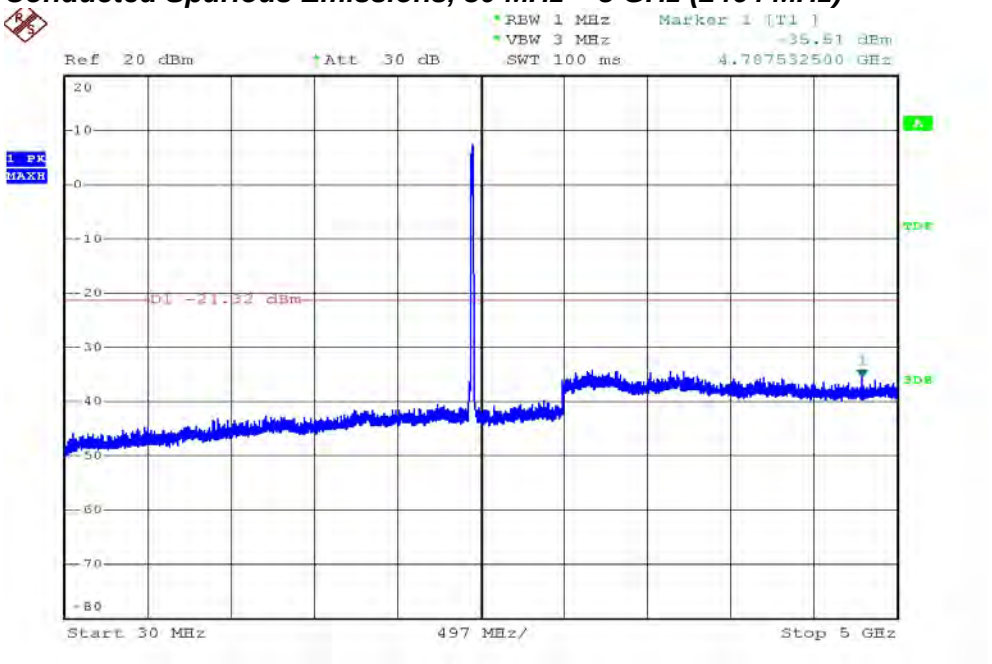


Conducted Spurious Emissions, 18 GHz ~ 25 GHz (2438 MHz)

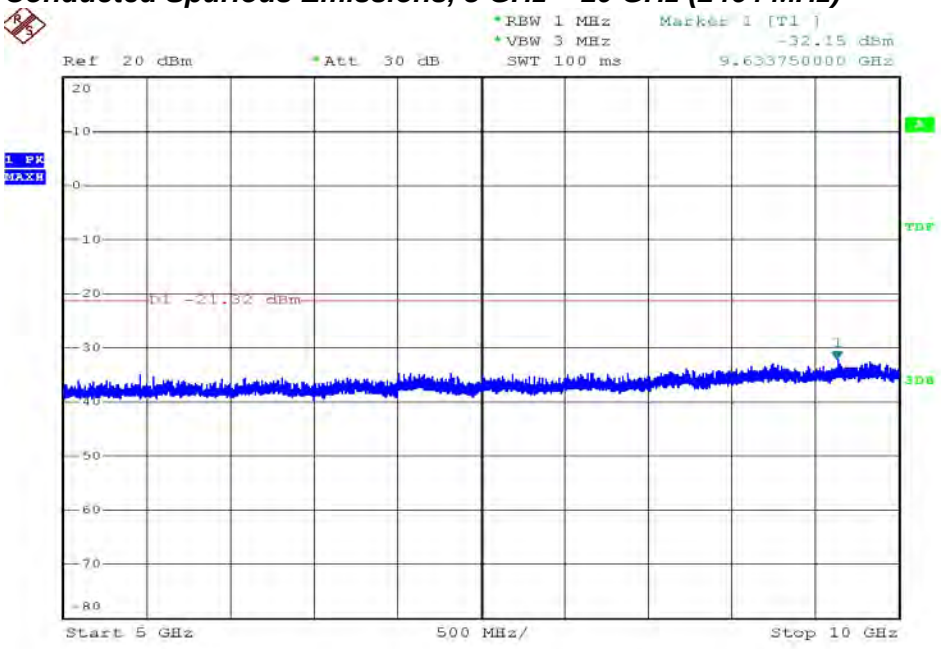


PLOT OF TEST DATA

Conducted Spurious Emissions, 30 MHz ~ 5 GHz (2464 MHz)

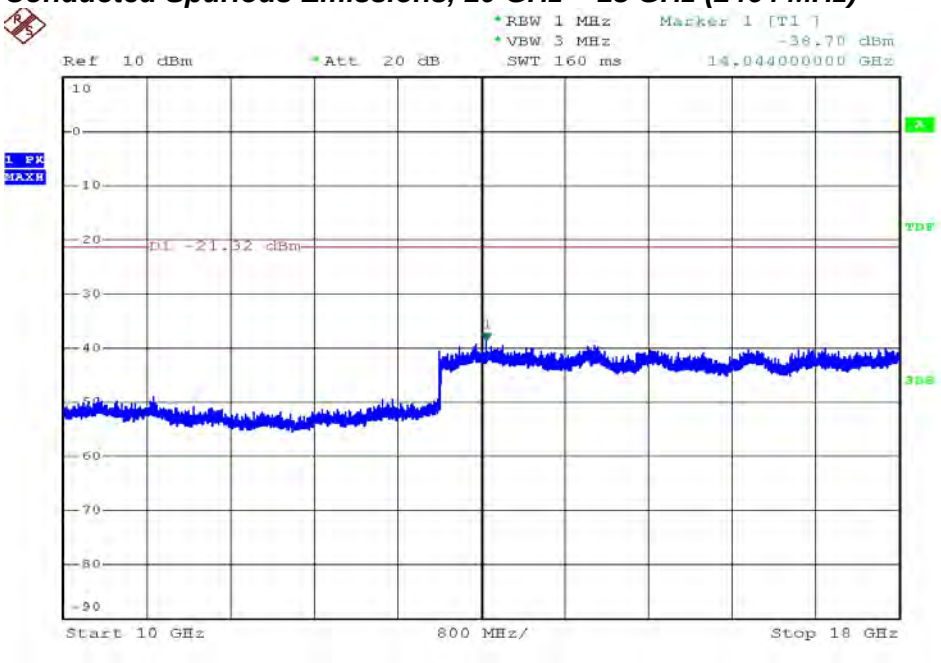


Conducted Spurious Emissions, 5 GHz ~ 10 GHz (2464 MHz)

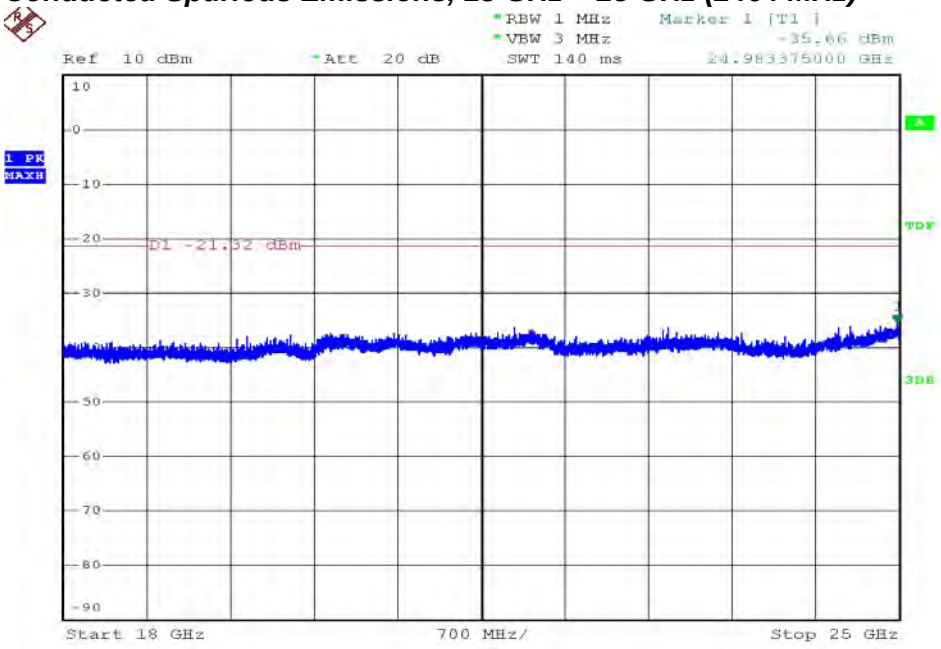


PLOT OF TEST DATA

Conducted Spurious Emissions, 10 GHz ~ 18 GHz (2464 MHz)

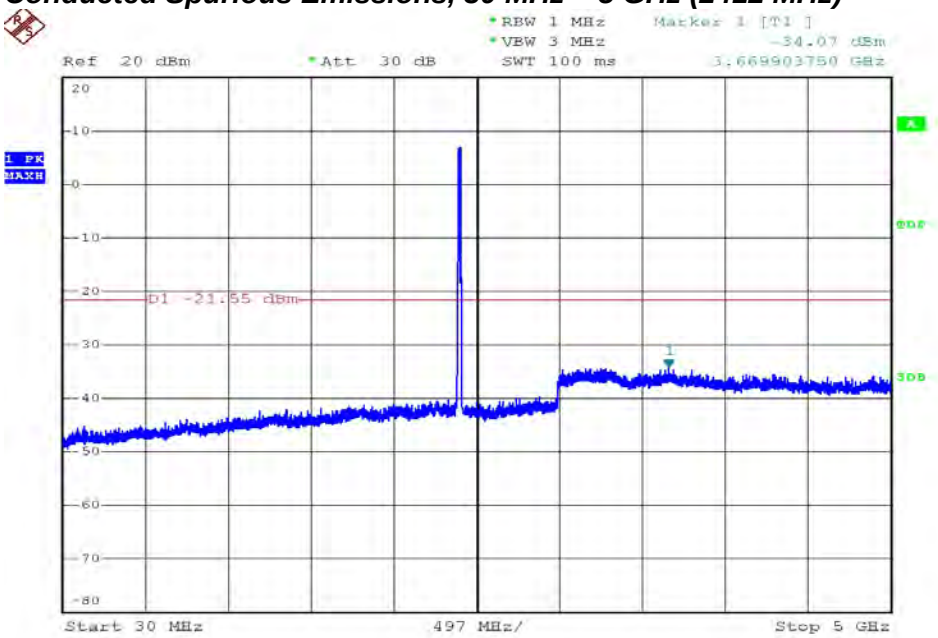


Conducted Spurious Emissions, 18 GHz ~ 25 GHz (2464 MHz)

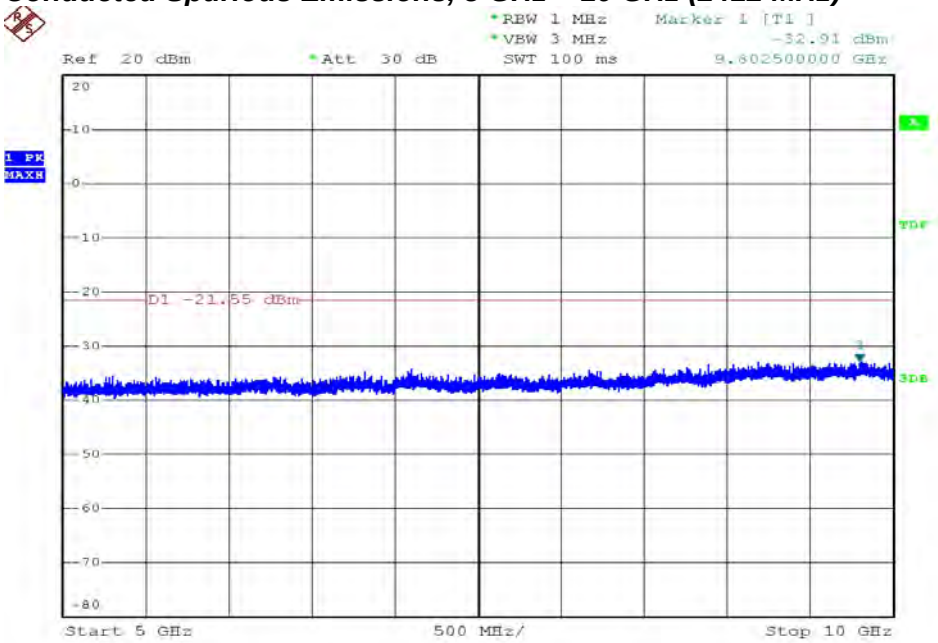


Ant B

Conducted Spurious Emissions, 30 MHz ~ 5 GHz (2412 MHz)

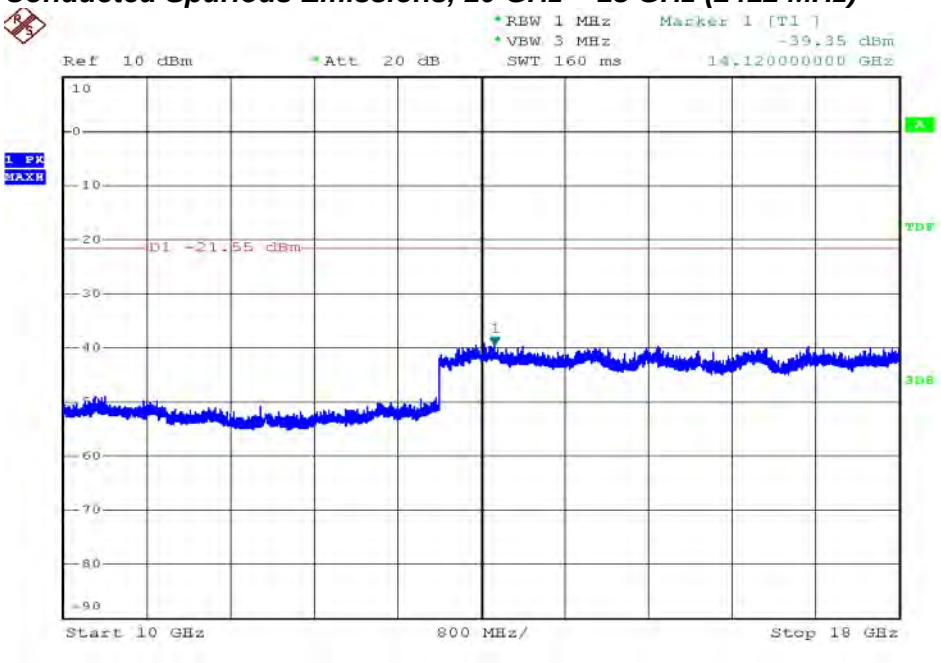


Conducted Spurious Emissions, 5 GHz ~ 10 GHz (2412 MHz)

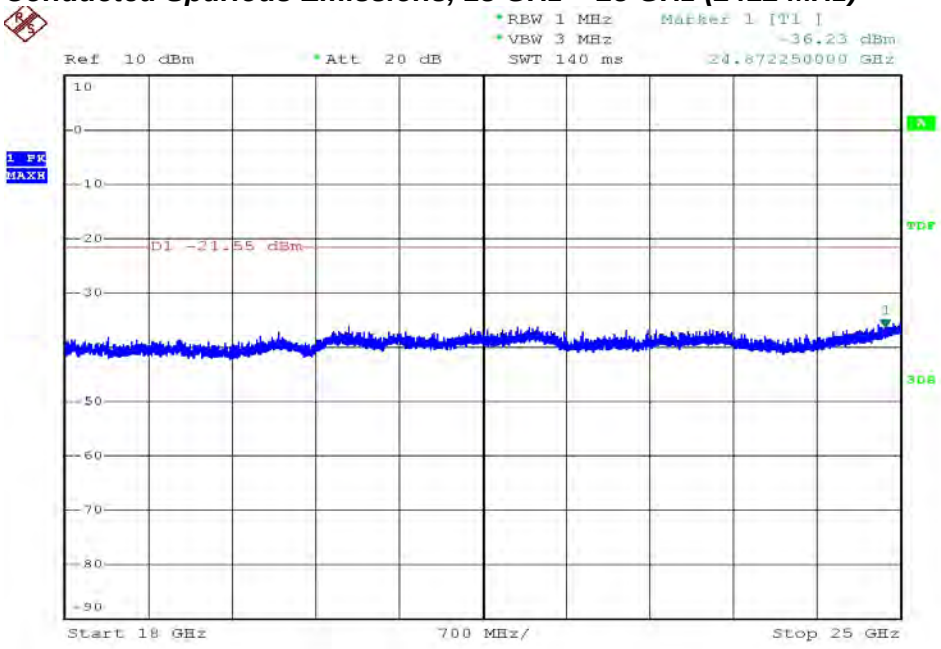


PLOT OF TEST DATA

Conducted Spurious Emissions, 10 GHz ~ 18 GHz (2412 MHz)

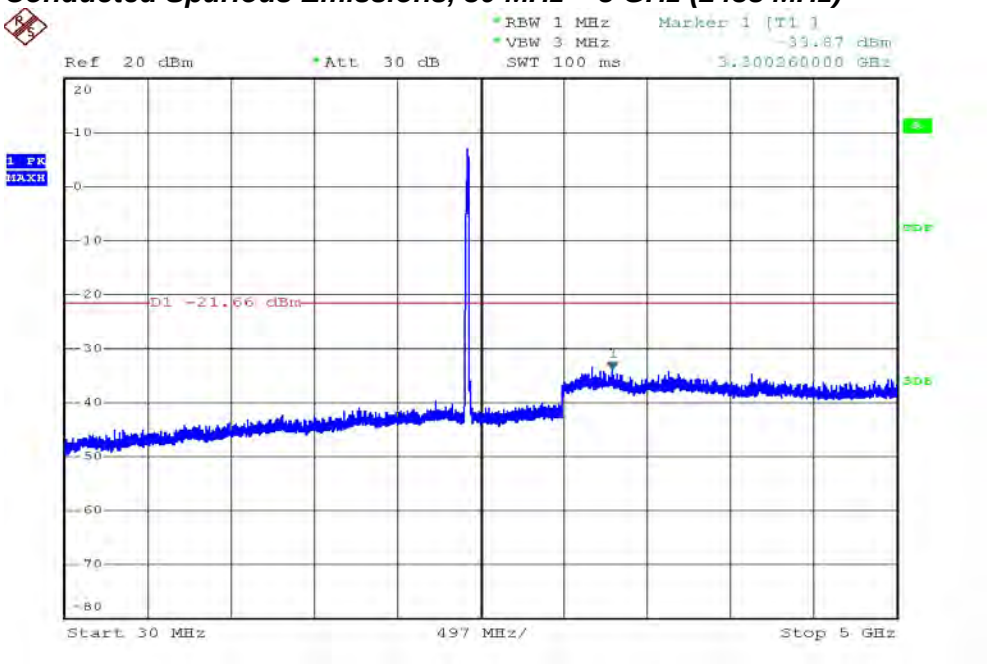


Conducted Spurious Emissions, 18 GHz ~ 25 GHz (2412 MHz)

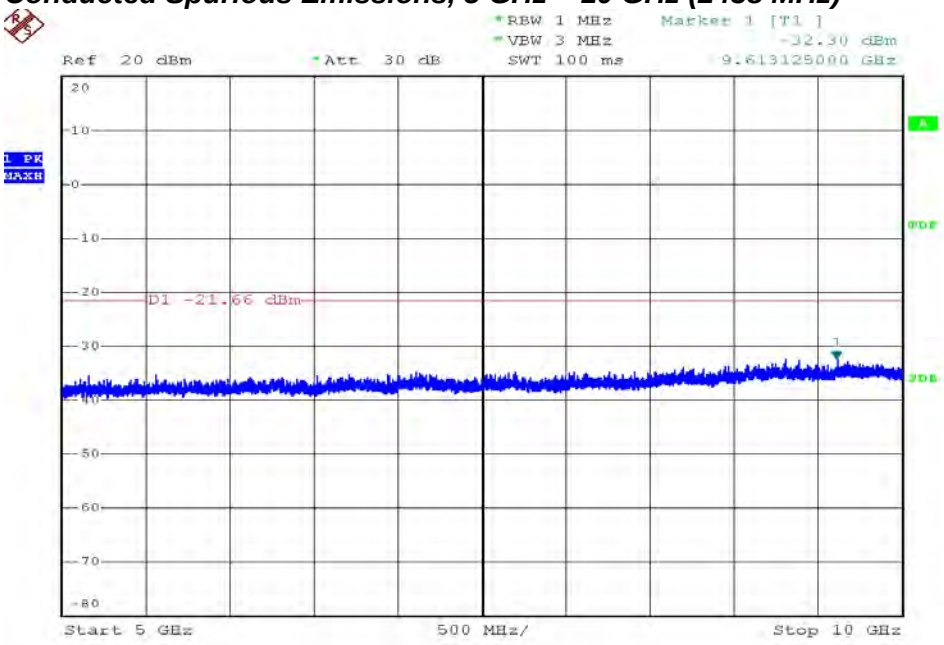


PLOT OF TEST DATA

Conducted Spurious Emissions, 30 MHz ~ 5 GHz (2438 MHz)

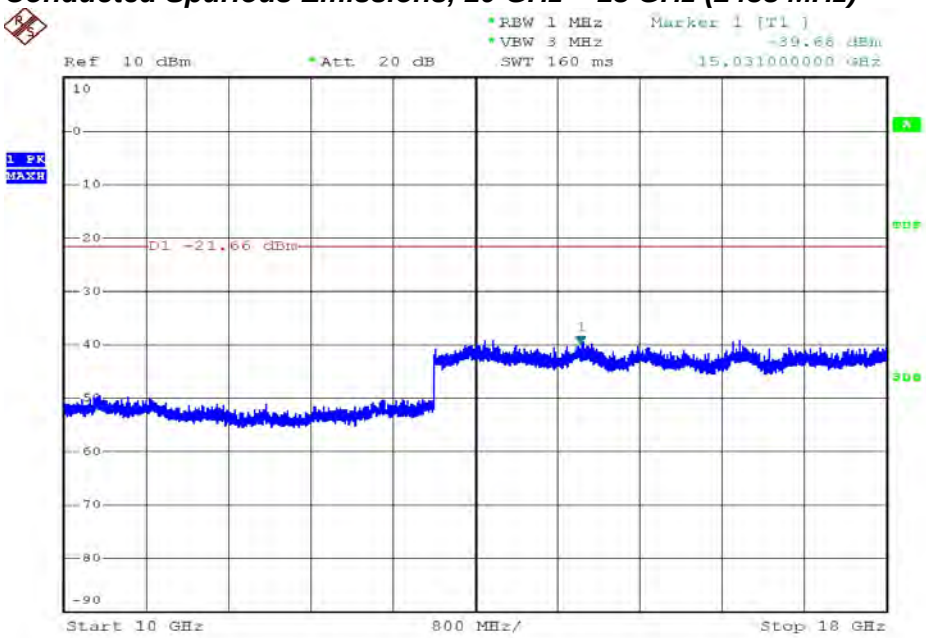


Conducted Spurious Emissions, 5 GHz ~ 10 GHz (2438 MHz)

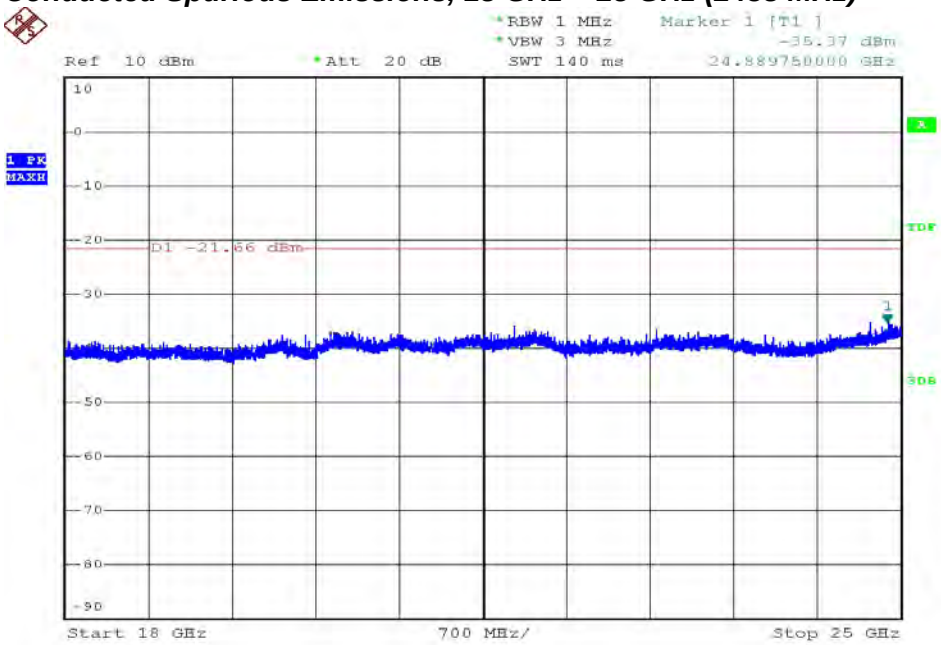


PLOT OF TEST DATA

Conducted Spurious Emissions, 10 GHz ~ 18 GHz (2438 MHz)

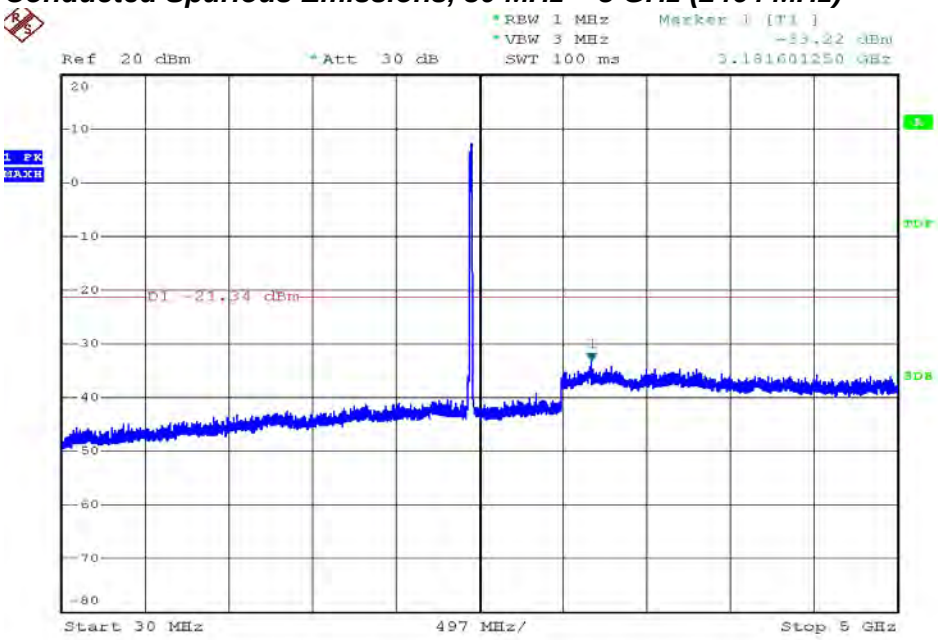


Conducted Spurious Emissions, 18 GHz ~ 25 GHz (2438 MHz)

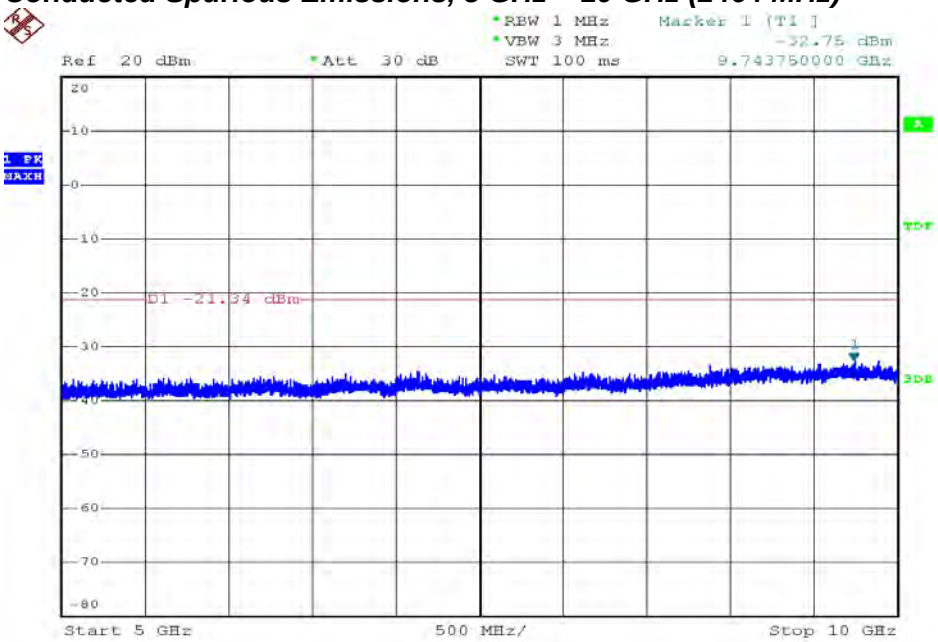


PLOT OF TEST DATA

Conducted Spurious Emissions, 30 MHz ~ 5 GHz (2464 MHz)

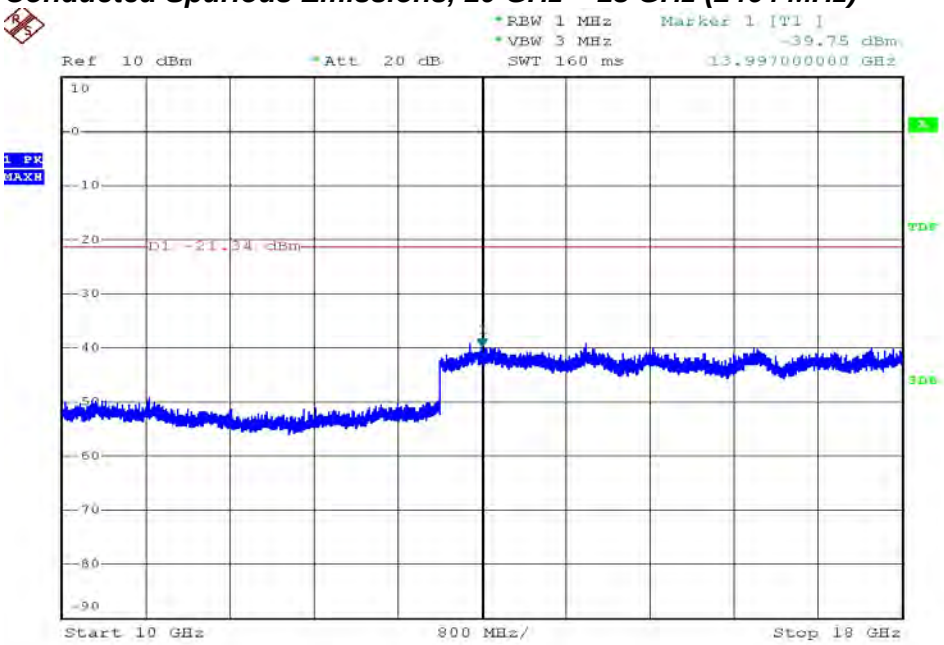


Conducted Spurious Emissions, 5 GHz ~ 10 GHz (2464 MHz)

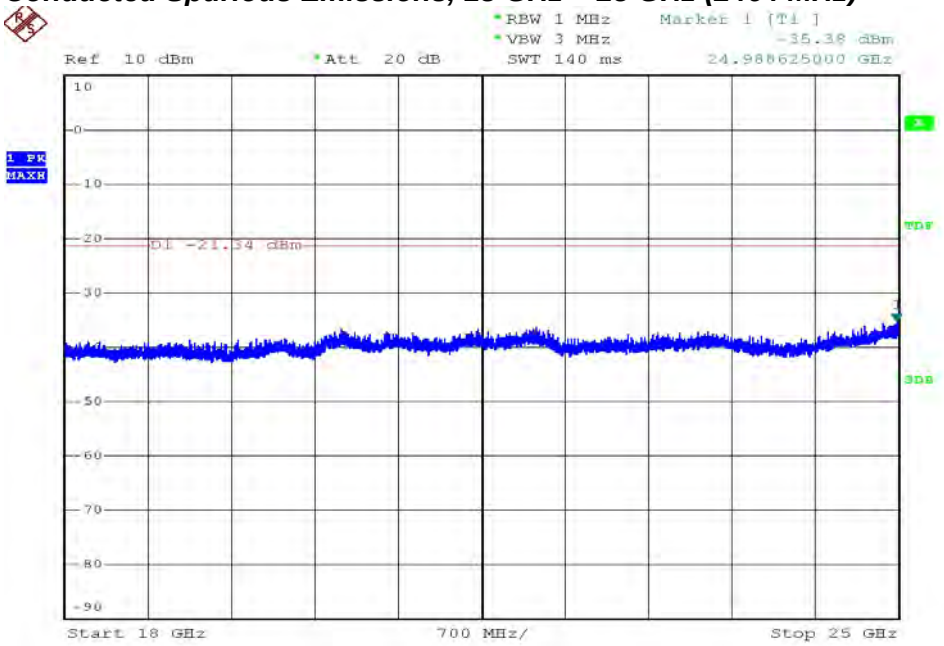


PLOT OF TEST DATA

Conducted Spurious Emissions, 10 GHz ~ 18 GHz (2464 MHz)



Conducted Spurious Emissions, 18 GHz ~ 25 GHz (2464 MHz)

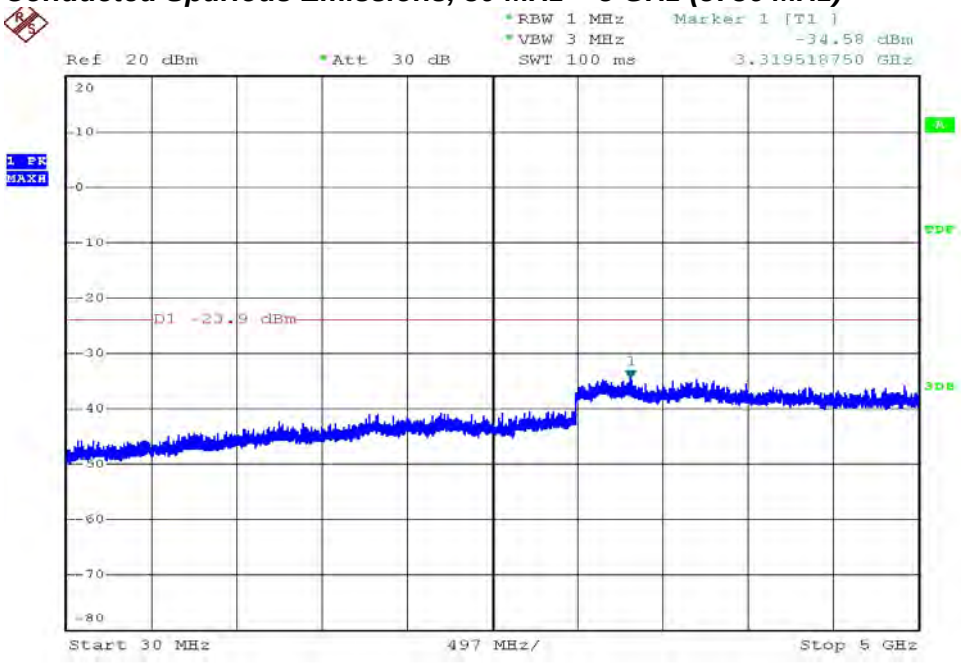


PLOT OF TEST DATA

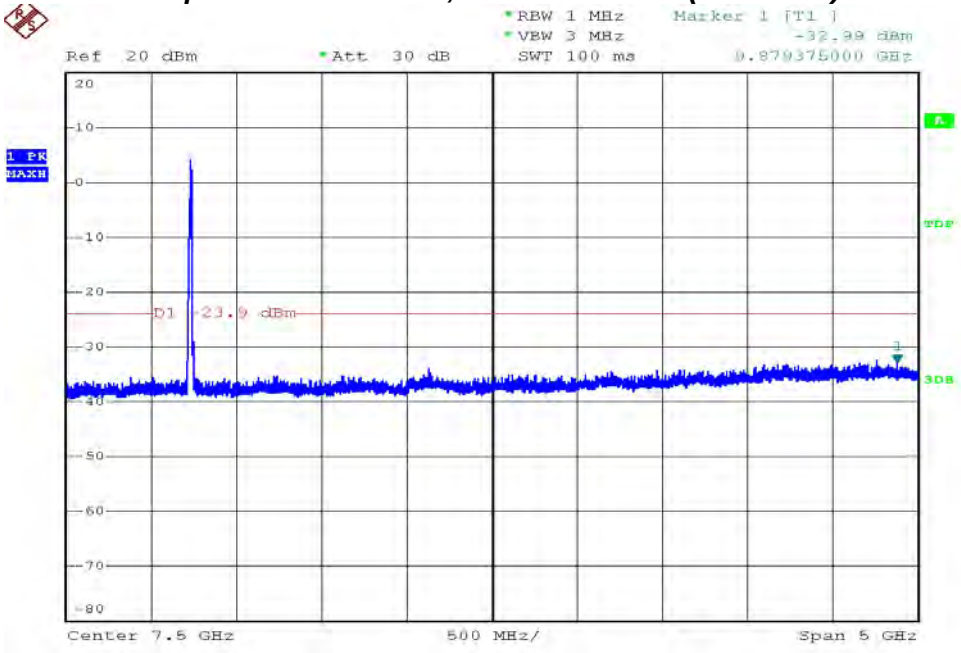
5.8 GHz band

Ant A

Conducted Spurious Emissions, 30 MHz ~ 5 GHz (5736 MHz)

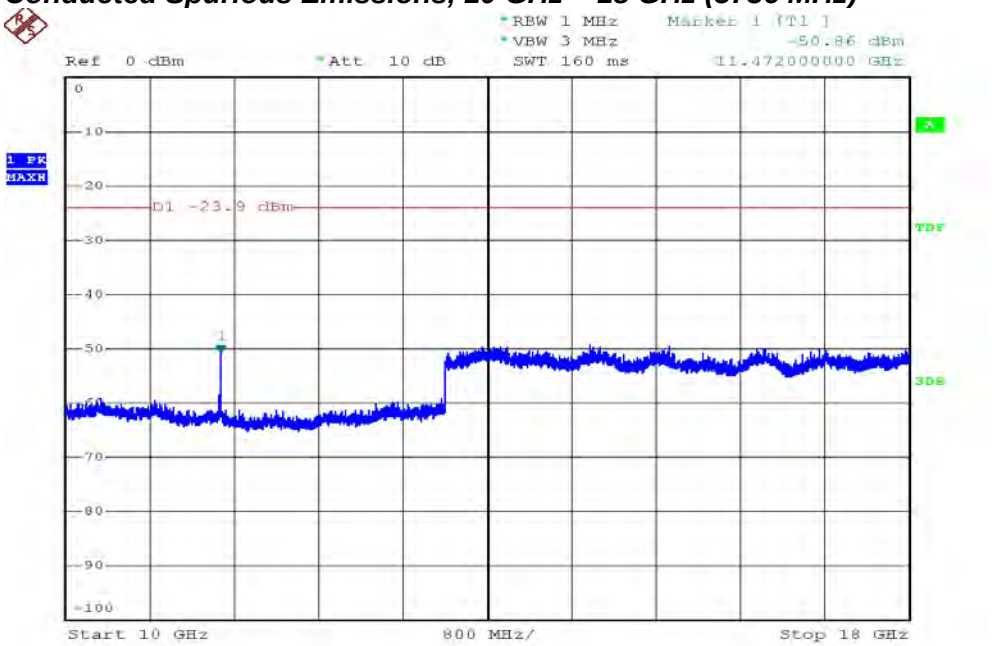


Conducted Spurious Emissions, 5 GHz ~ 10 GHz (5736 MHz)

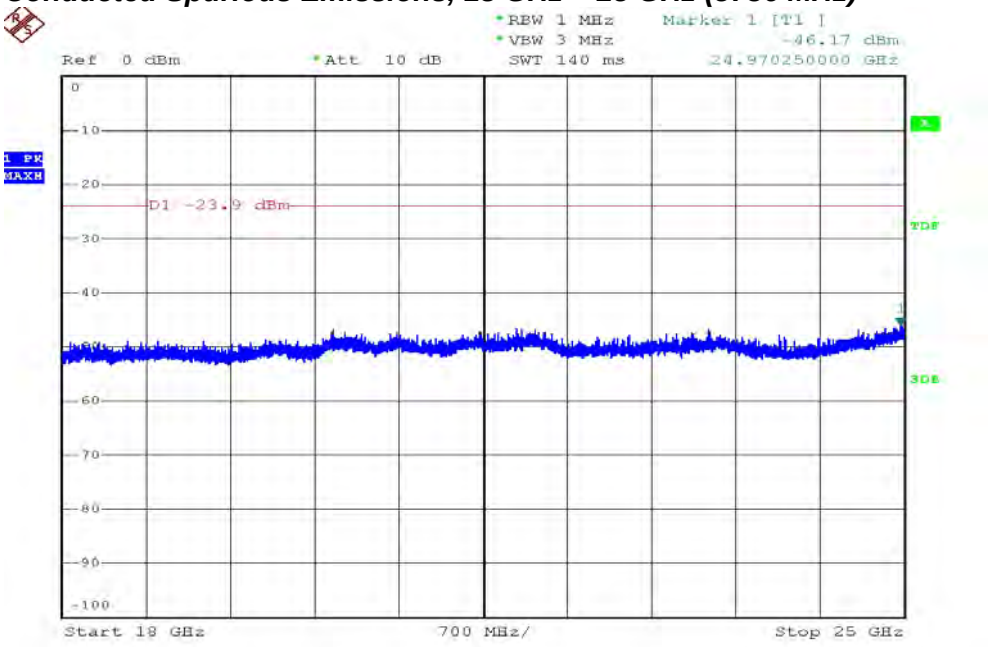


PLOT OF TEST DATA

Conducted Spurious Emissions, 10 GHz ~ 18 GHz (5736 MHz)

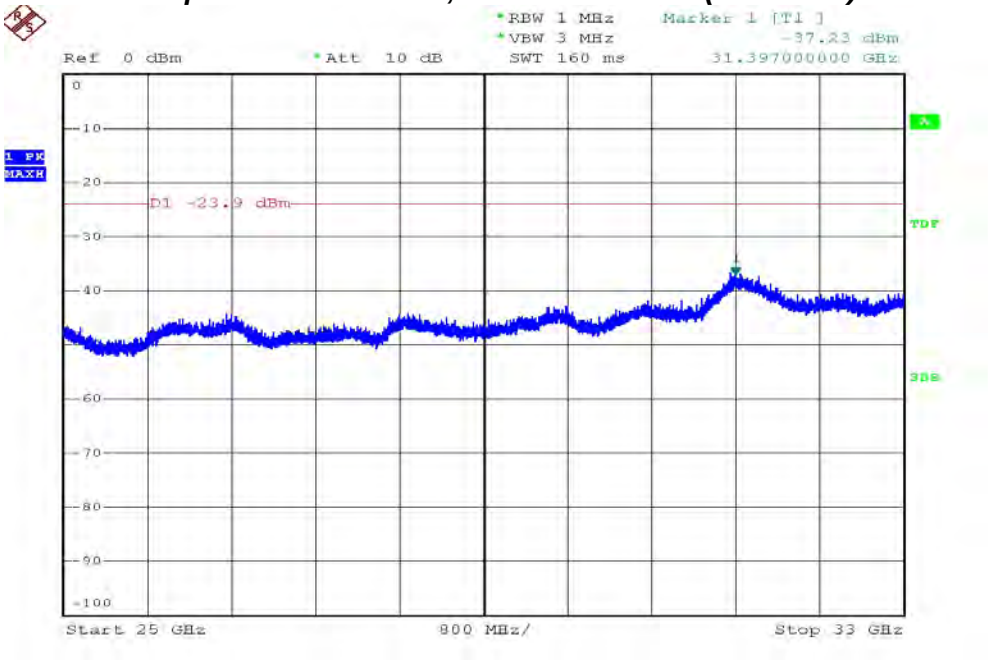


Conducted Spurious Emissions, 18 GHz ~ 25 GHz (5736 MHz)

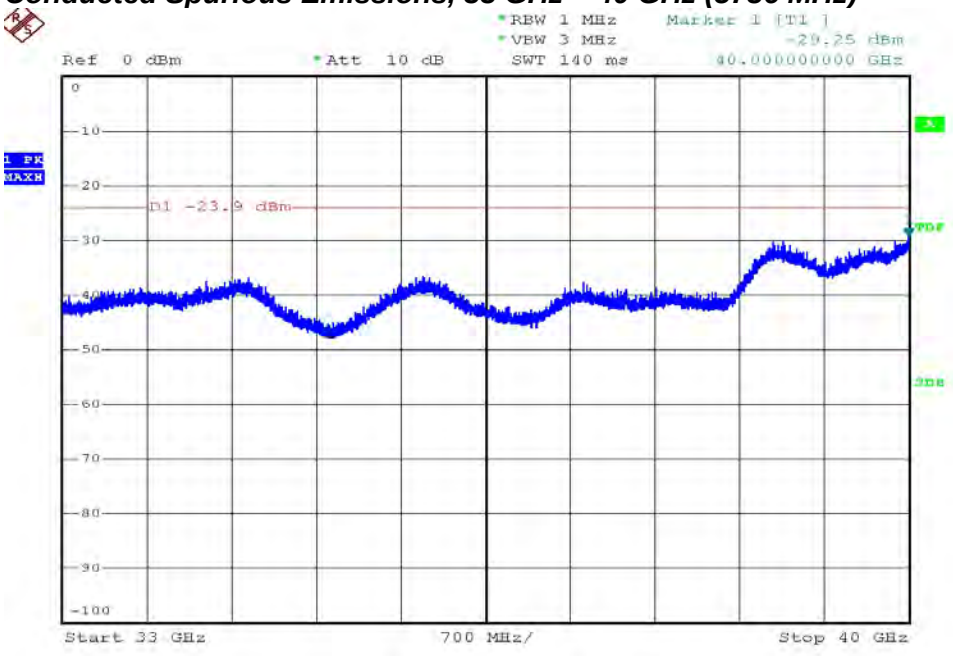


PLOT OF TEST DATA

Conducted Spurious Emissions, 25 GHz ~ 33 GHz (5736 MHz)

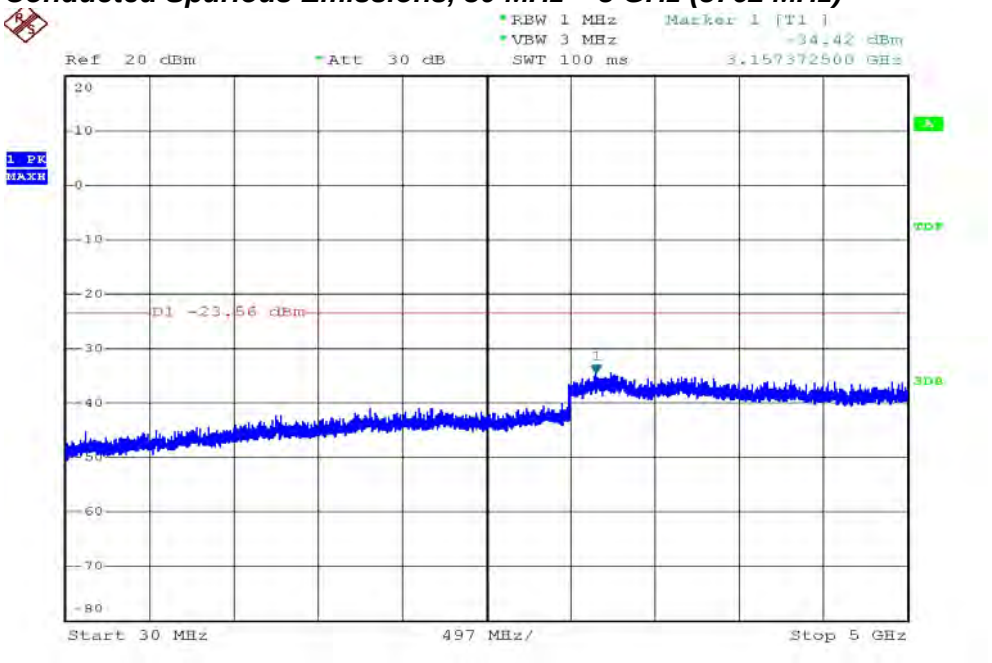


Conducted Spurious Emissions, 33 GHz ~ 40 GHz (5736 MHz)

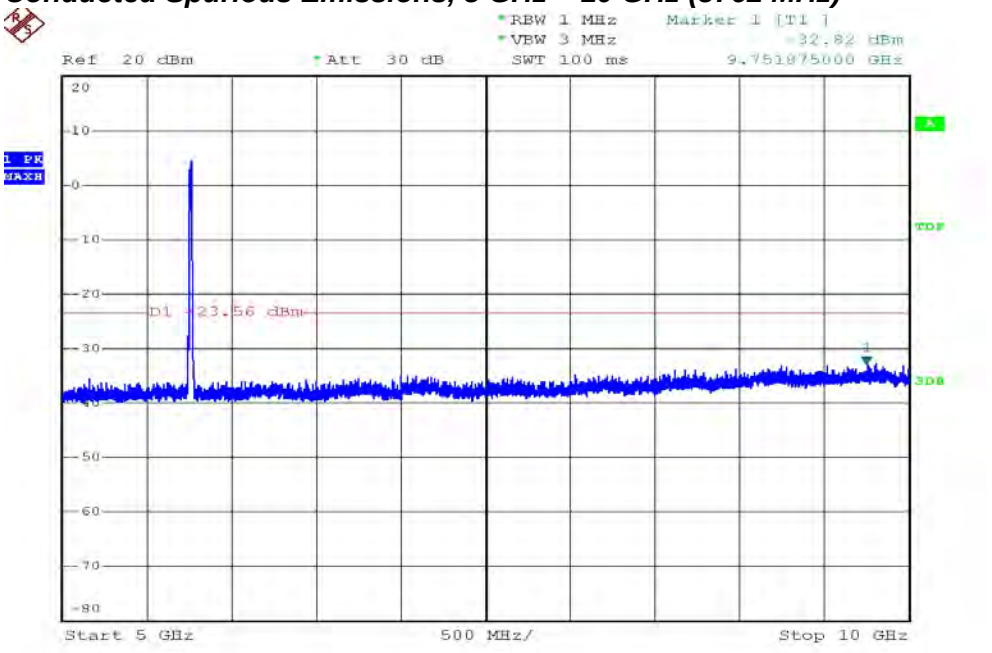


PLOT OF TEST DATA

Conducted Spurious Emissions, 30 MHz ~ 5 GHz (5762 MHz)

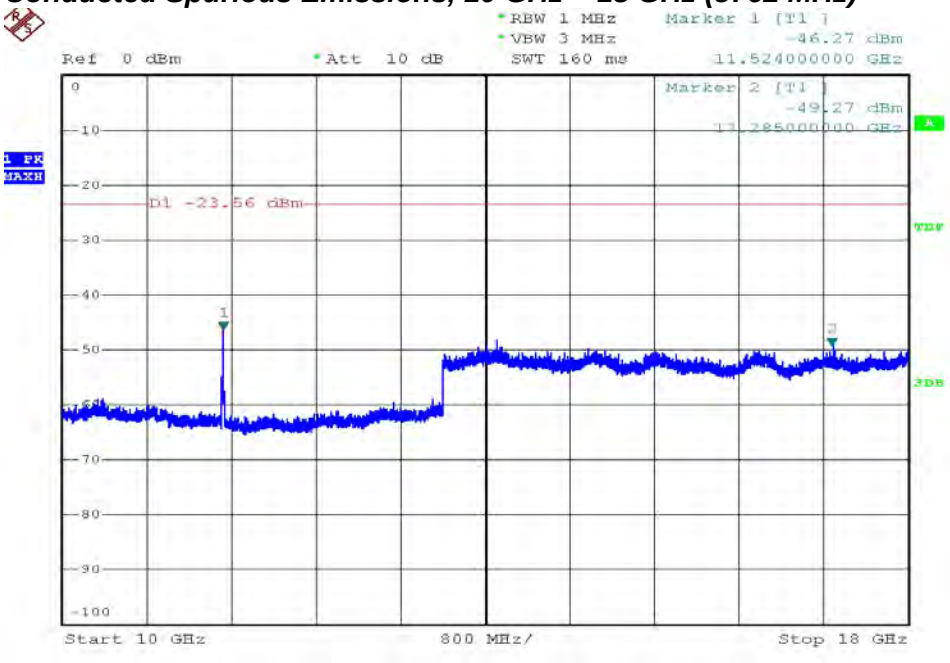


Conducted Spurious Emissions, 5 GHz ~ 10 GHz (5762 MHz)

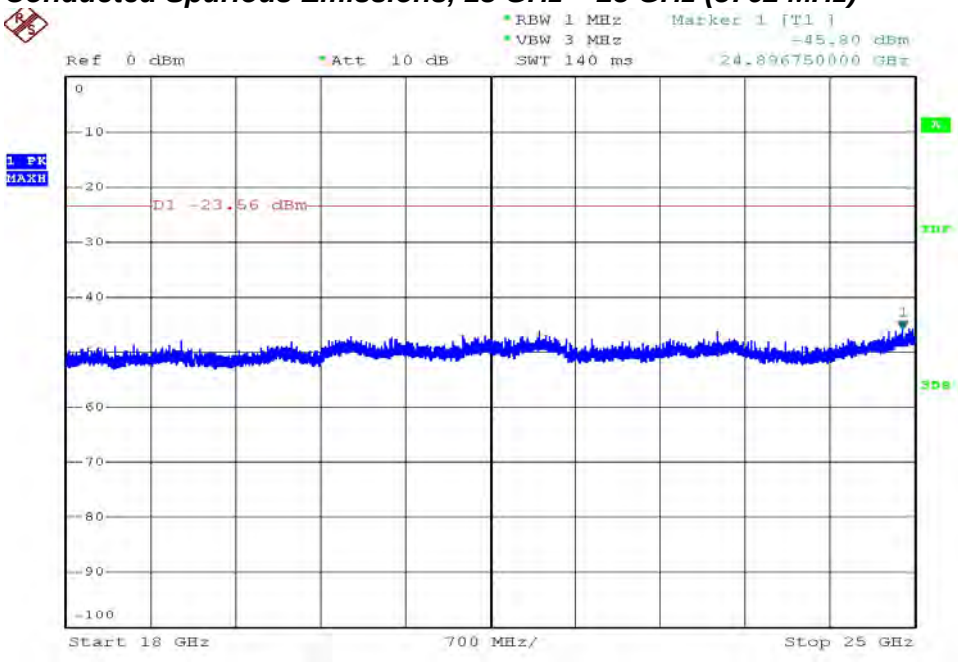


PLOT OF TEST DATA

Conducted Spurious Emissions, 10 GHz ~ 18 GHz (5762 MHz)

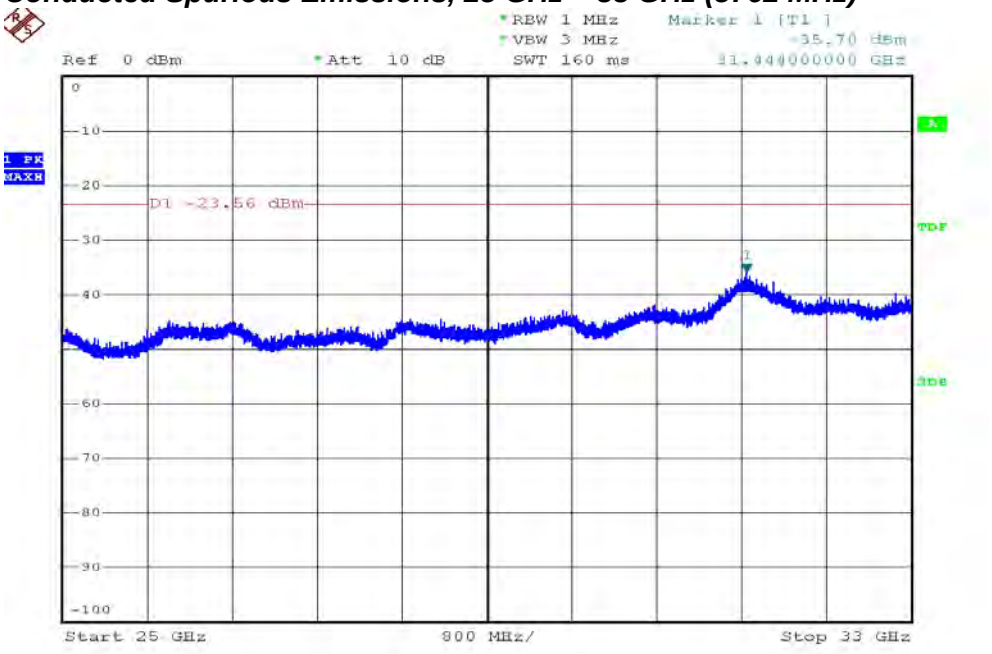


Conducted Spurious Emissions, 18 GHz ~ 25 GHz (5762 MHz)

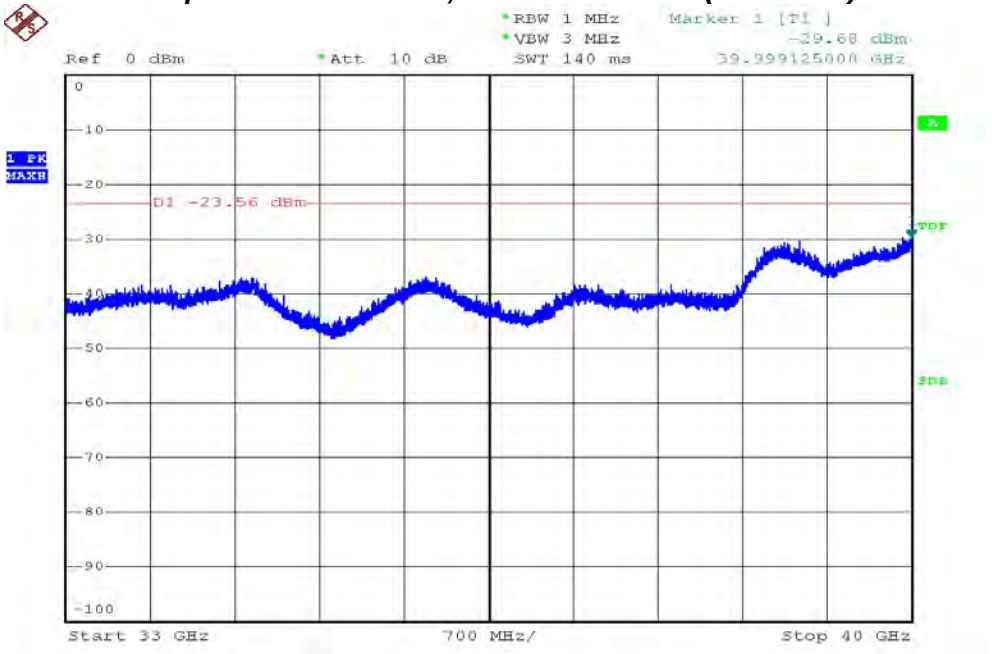


PLOT OF TEST DATA

Conducted Spurious Emissions, 25 GHz ~ 33 GHz (5762 MHz)

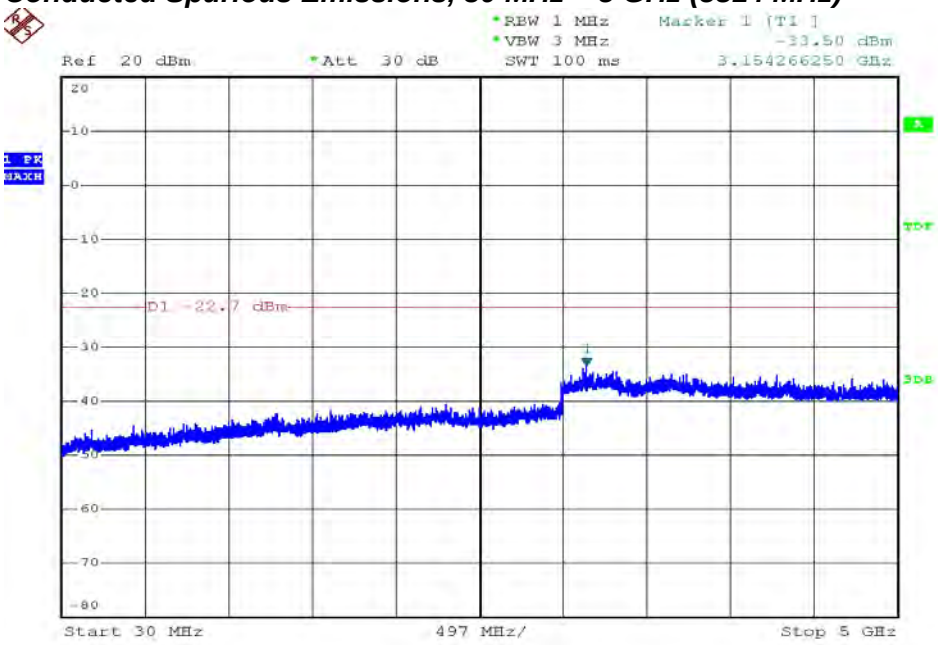


Conducted Spurious Emissions, 33 GHz ~ 40 GHz (5762 MHz)

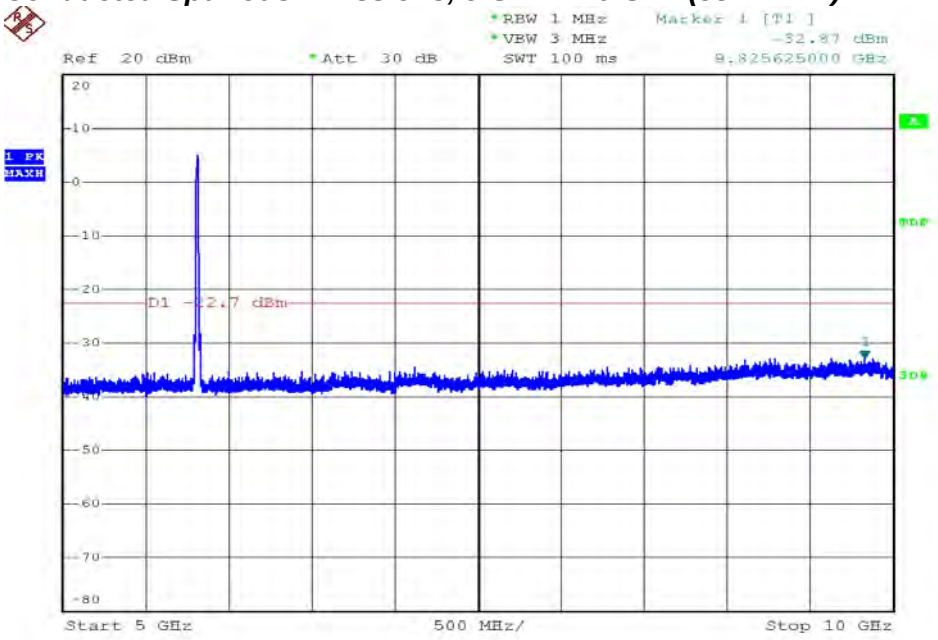


PLOT OF TEST DATA

Conducted Spurious Emissions, 30 MHz ~ 5 GHz (5814 MHz)

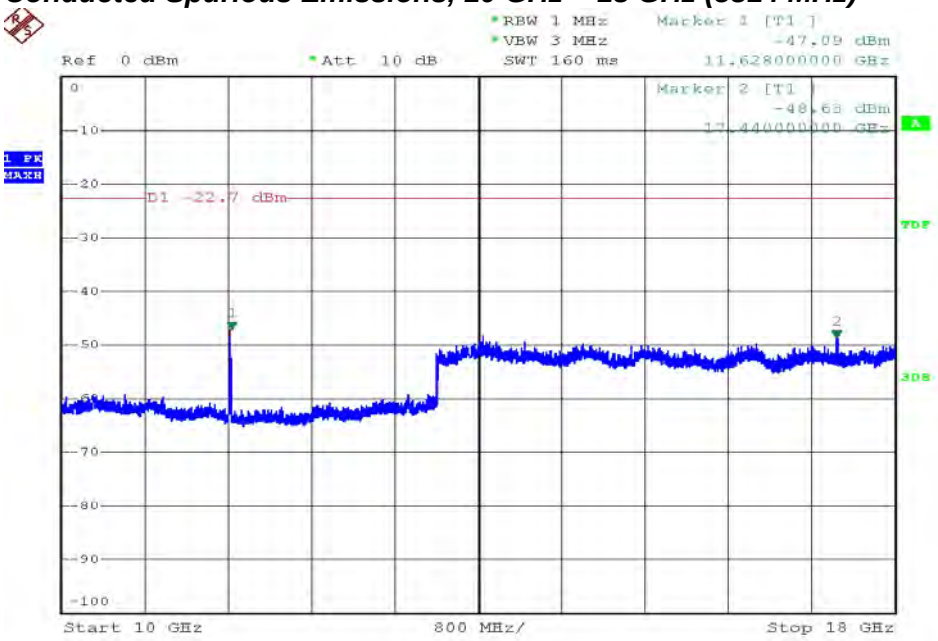


Conducted Spurious Emissions, 5 GHz ~ 10 GHz (5814 MHz)

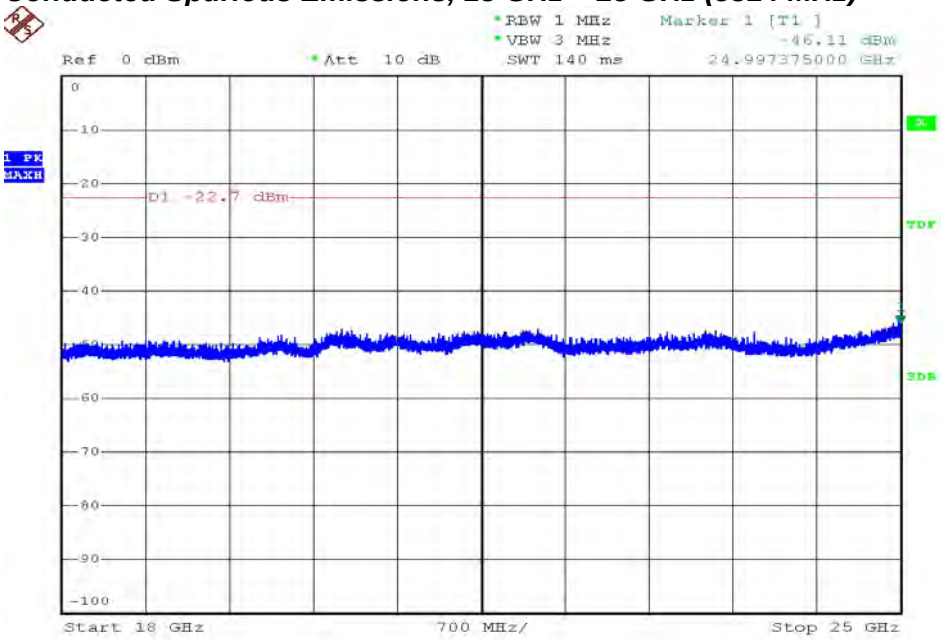


PLOT OF TEST DATA

Conducted Spurious Emissions, 10 GHz ~ 18 GHz (5814 MHz)

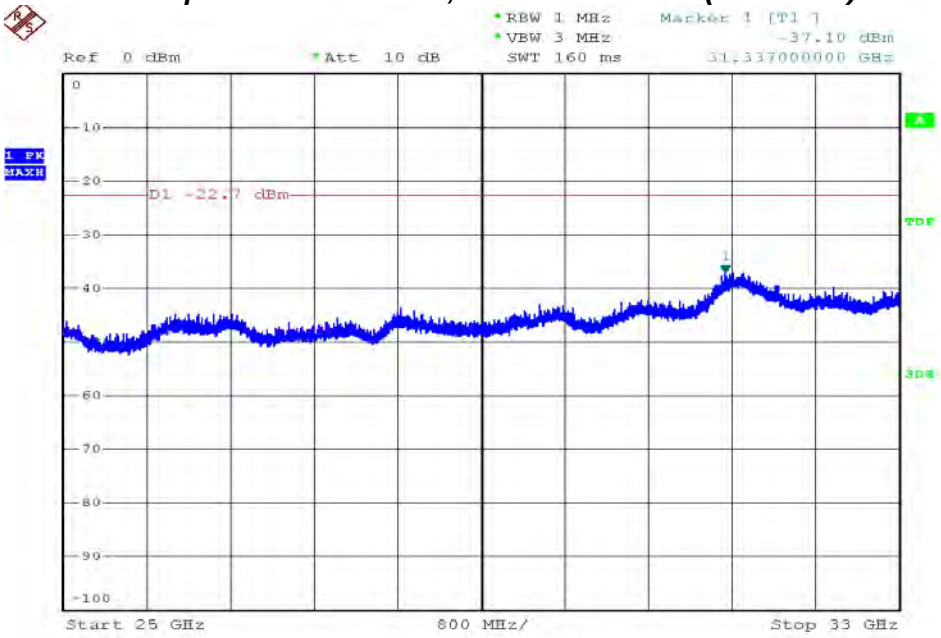


Conducted Spurious Emissions, 18 GHz ~ 25 GHz (5814 MHz)

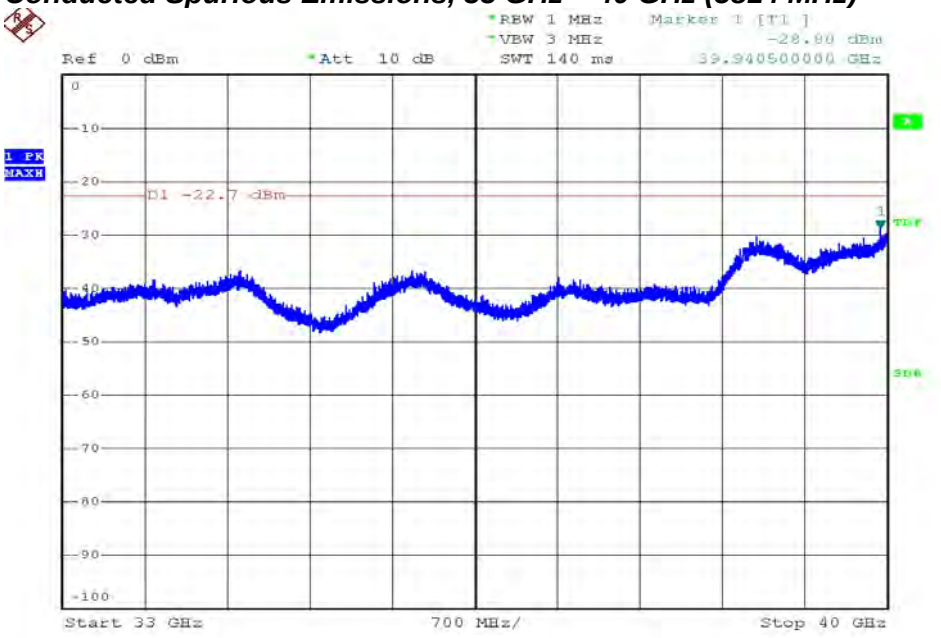


PLOT OF TEST DATA

Conducted Spurious Emissions, 25 GHz ~ 33 GHz (5814 MHz)



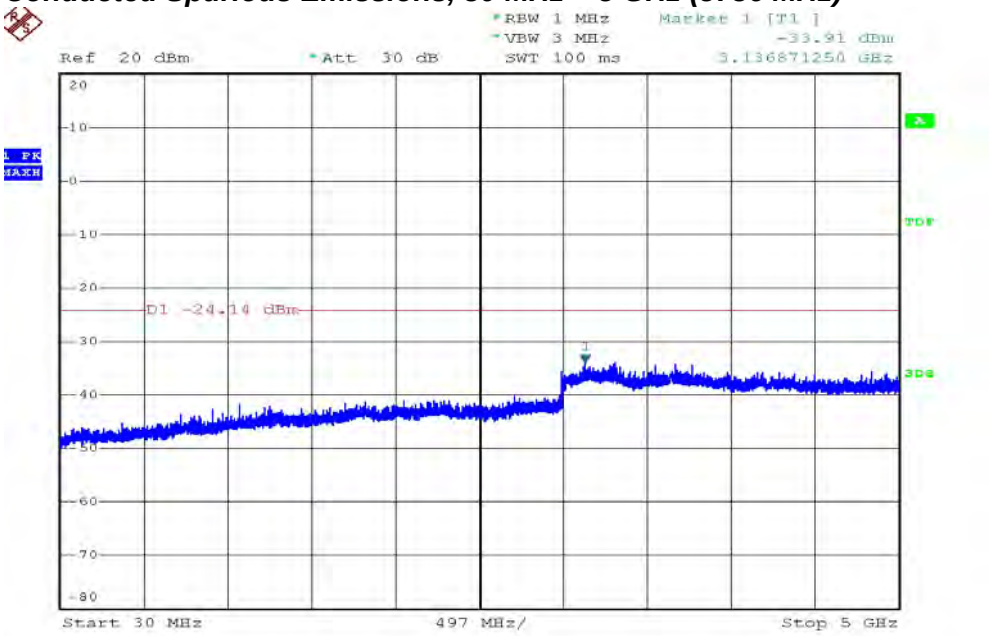
Conducted Spurious Emissions, 33 GHz ~ 40 GHz (5814 MHz)



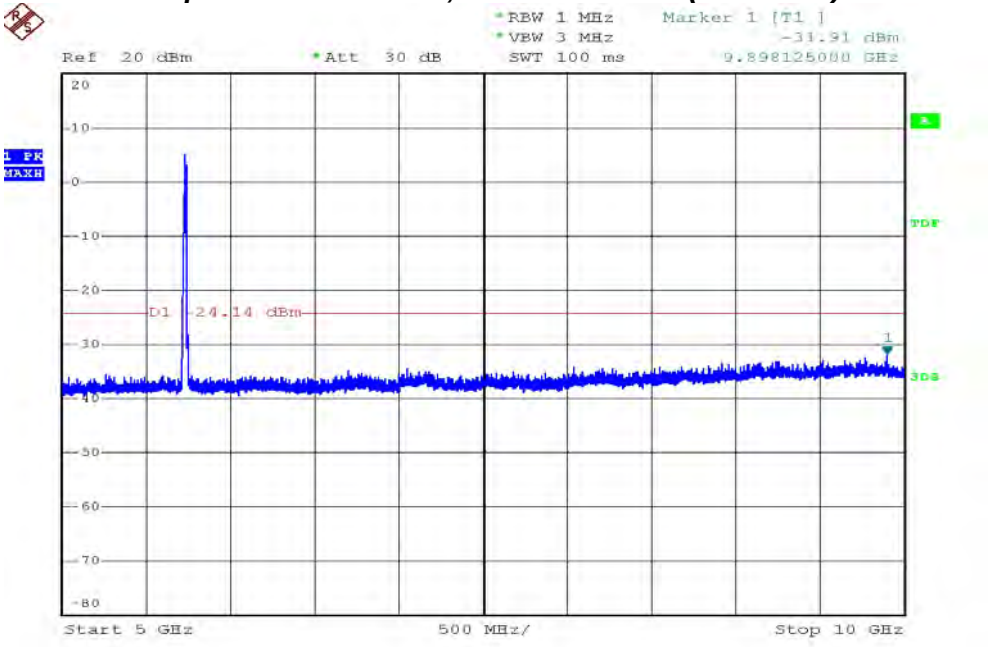
PLOT OF TEST DATA

Ant B

Conducted Spurious Emissions, 30 MHz ~ 5 GHz (5736 MHz)

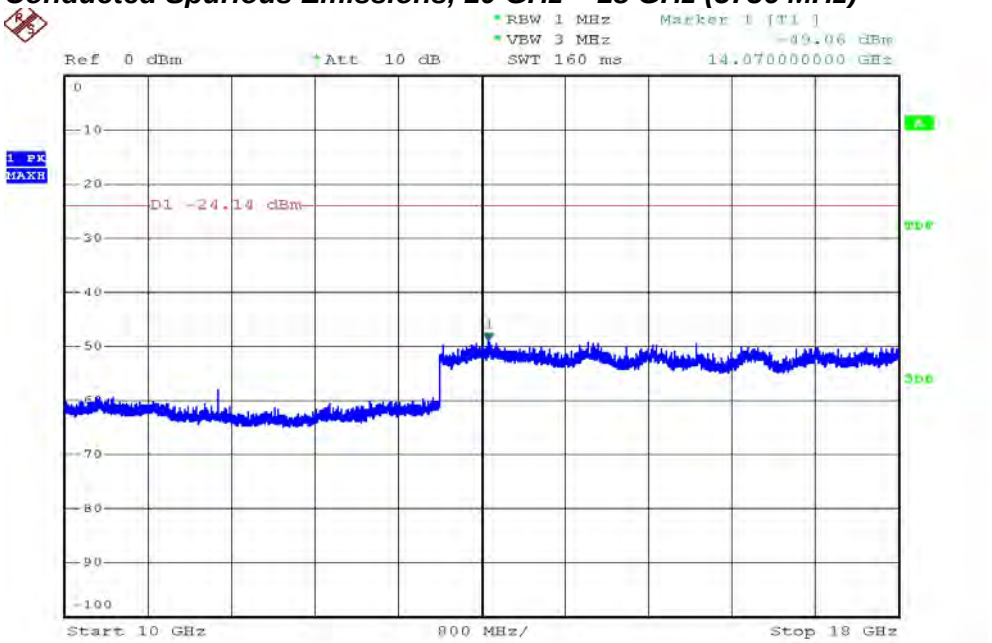


Conducted Spurious Emissions, 5 GHz ~ 10 GHz (5736 MHz)

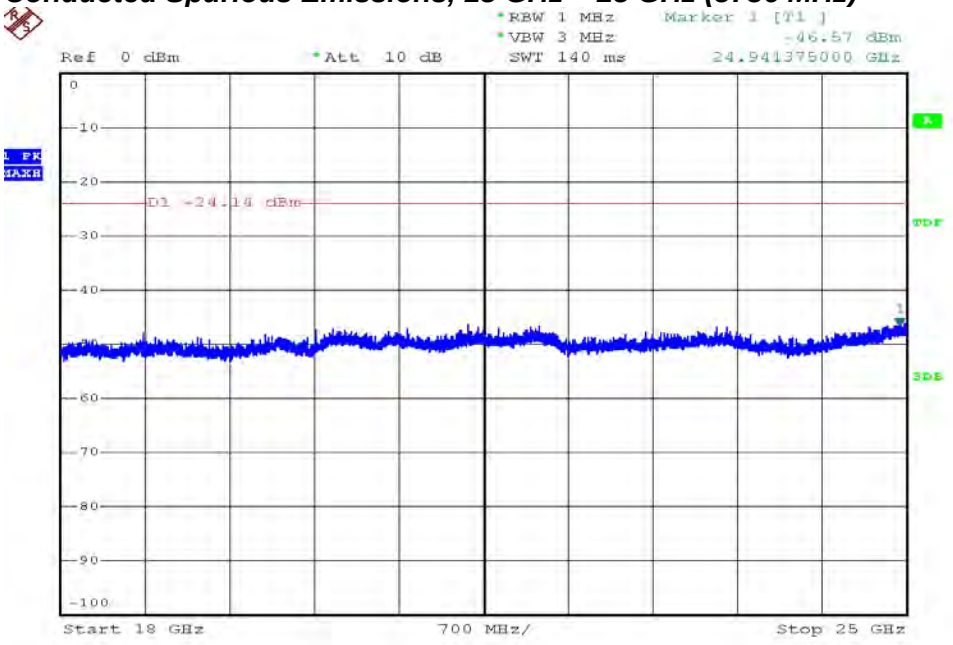


PLOT OF TEST DATA

Conducted Spurious Emissions, 10 GHz ~ 18 GHz (5736 MHz)

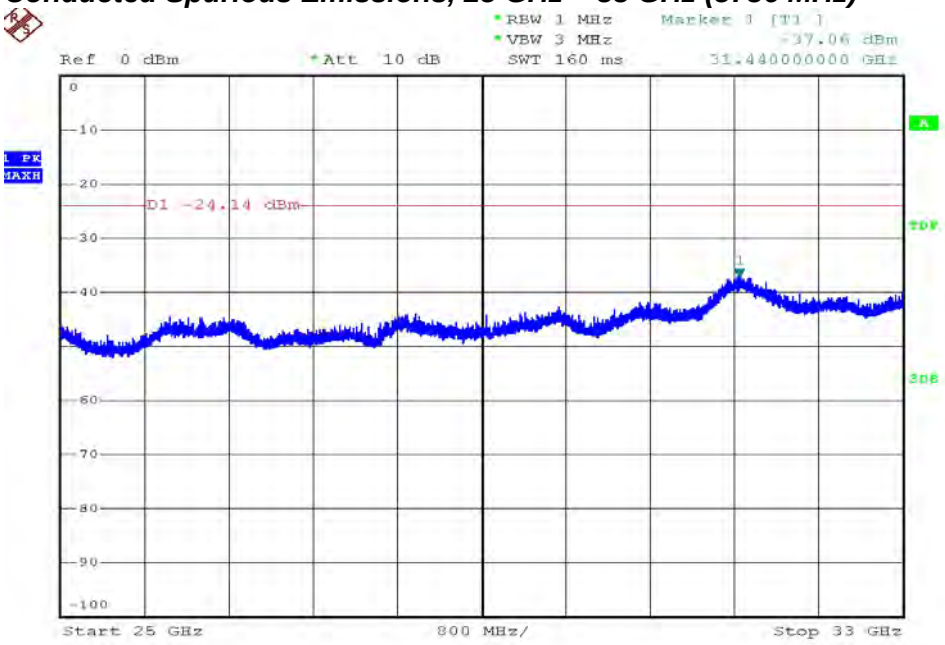


Conducted Spurious Emissions, 18 GHz ~ 25 GHz (5736 MHz)

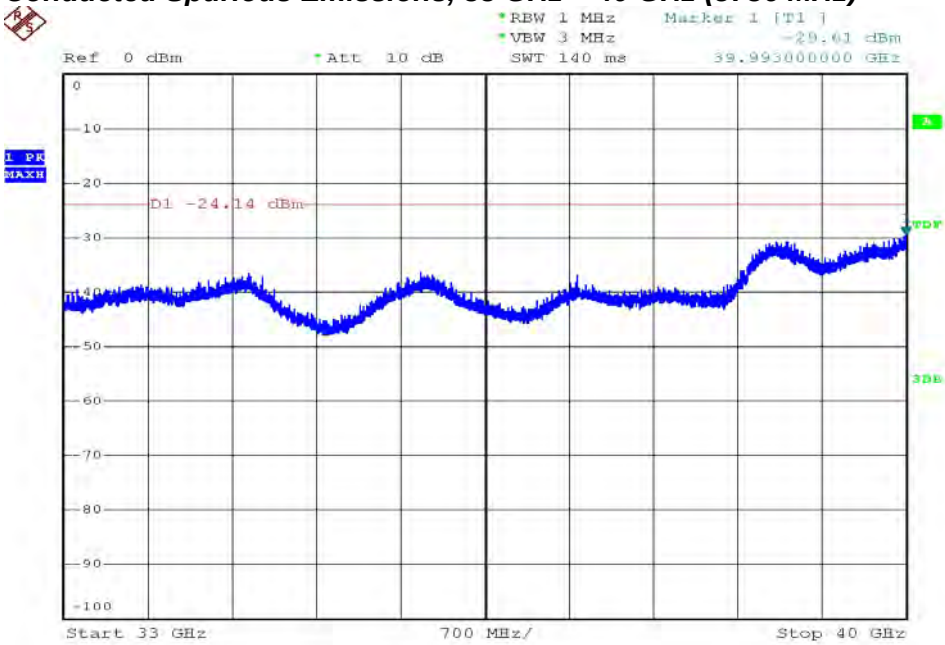


PLOT OF TEST DATA

Conducted Spurious Emissions, 25 GHz ~ 33 GHz (5736 MHz)

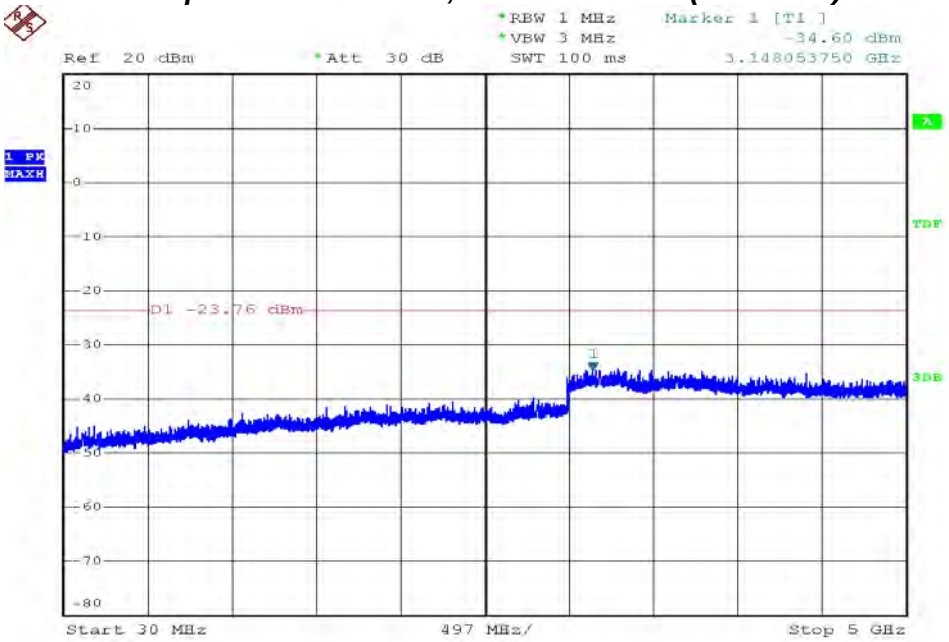


Conducted Spurious Emissions, 33 GHz ~ 40 GHz (5736 MHz)

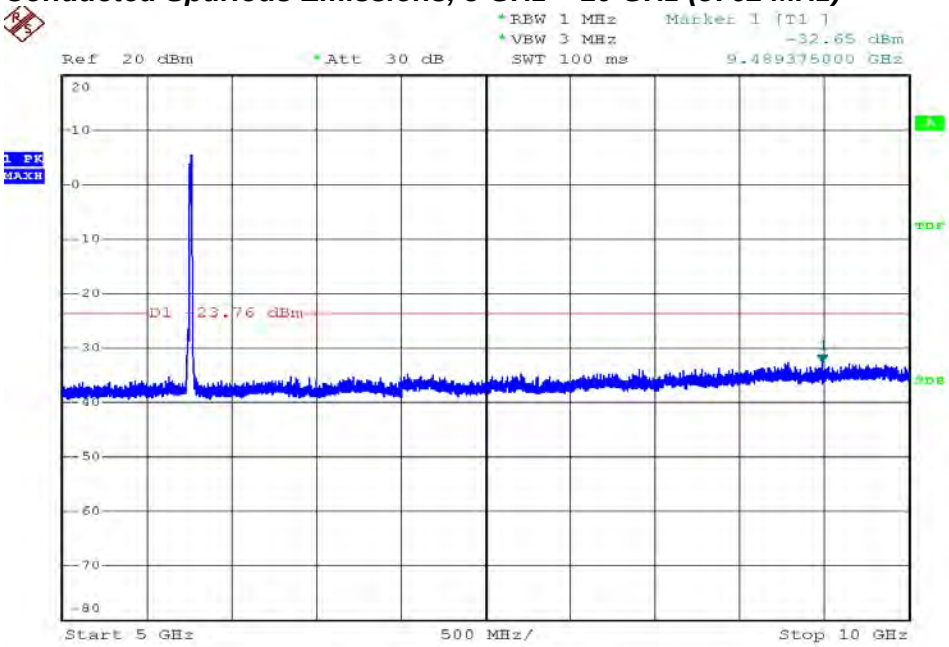


PLOT OF TEST DATA

Conducted Spurious Emissions, 30 MHz ~ 5 GHz (5762 MHz)

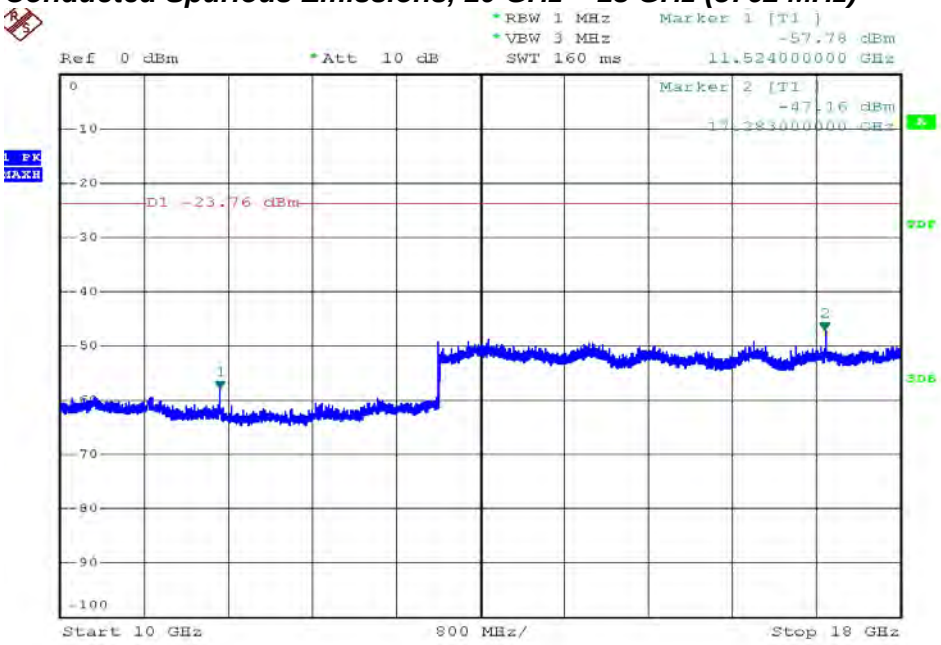


Conducted Spurious Emissions, 5 GHz ~ 10 GHz (5762 MHz)

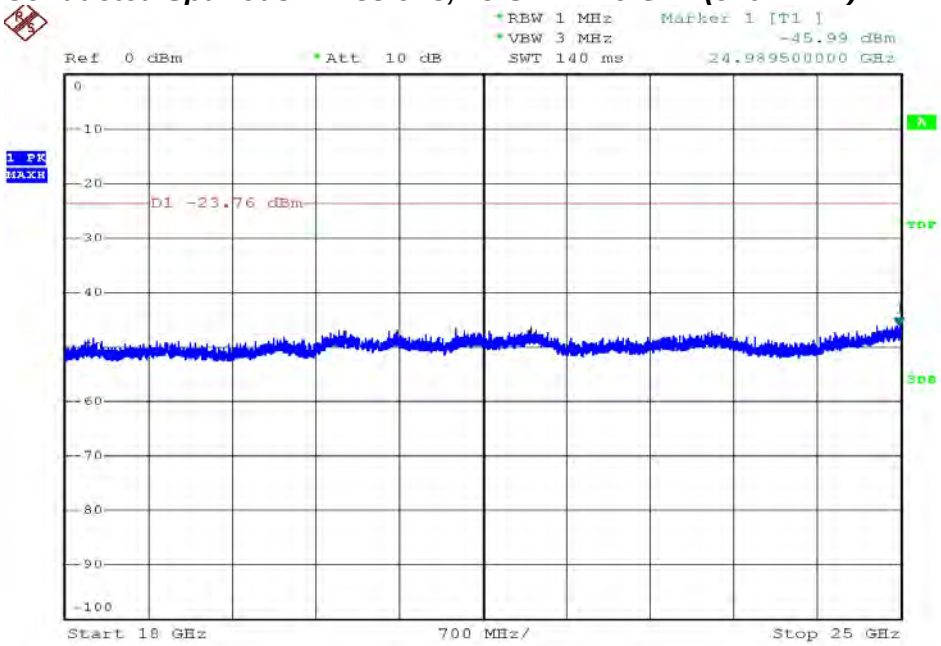


PLOT OF TEST DATA

Conducted Spurious Emissions, 10 GHz ~ 18 GHz (5762 MHz)

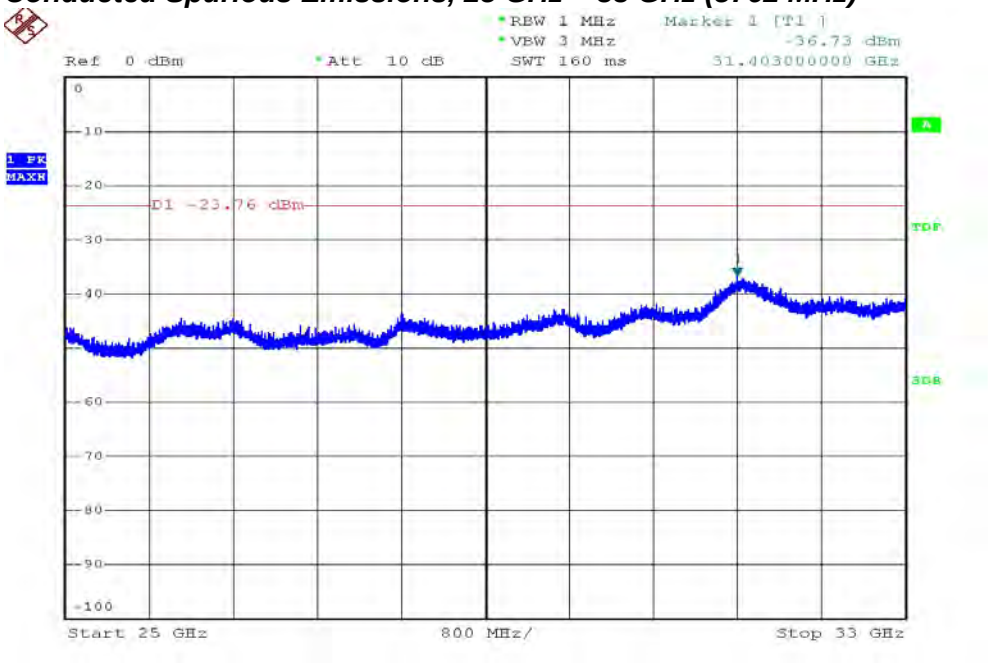


Conducted Spurious Emissions, 18 GHz ~ 25 GHz (5762 MHz)

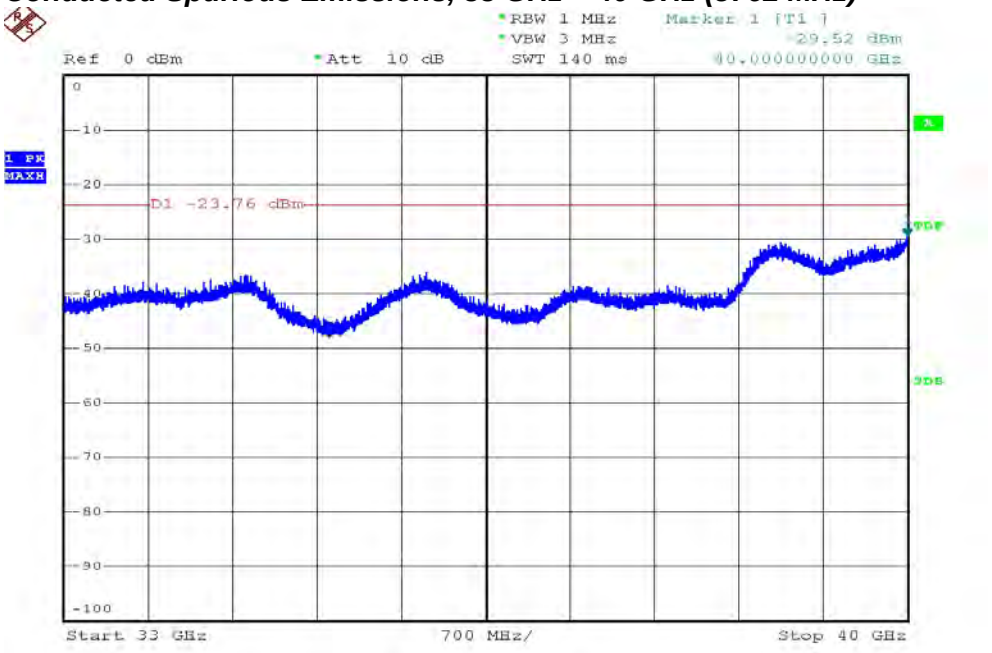


PLOT OF TEST DATA

Conducted Spurious Emissions, 25 GHz ~ 33 GHz (5762 MHz)

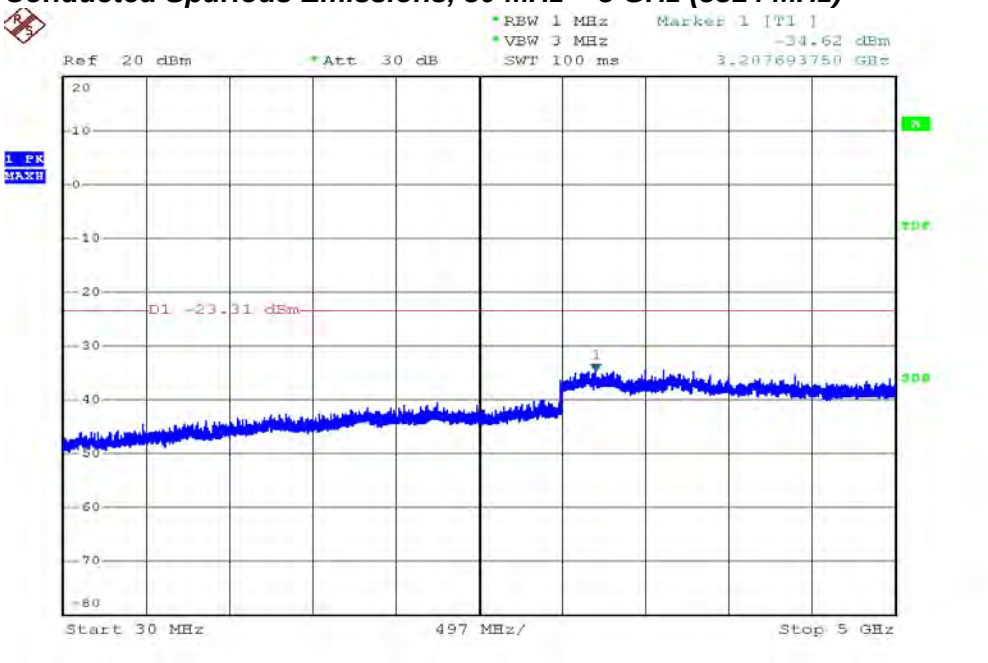


Conducted Spurious Emissions, 33 GHz ~ 40 GHz (5762 MHz)

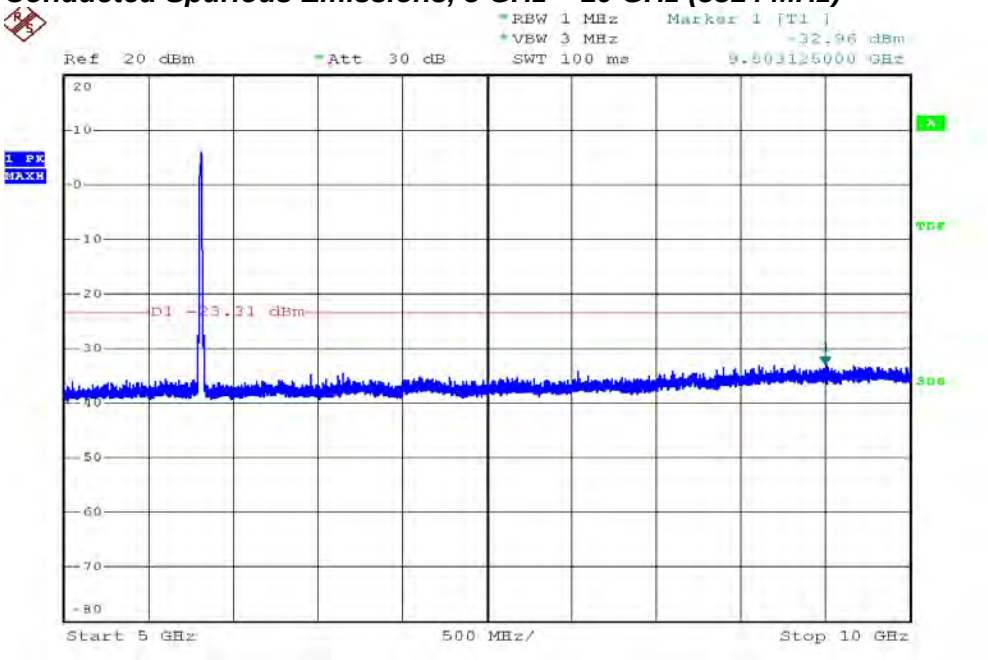


PLOT OF TEST DATA

Conducted Spurious Emissions, 30 MHz ~ 5 GHz (5814 MHz)

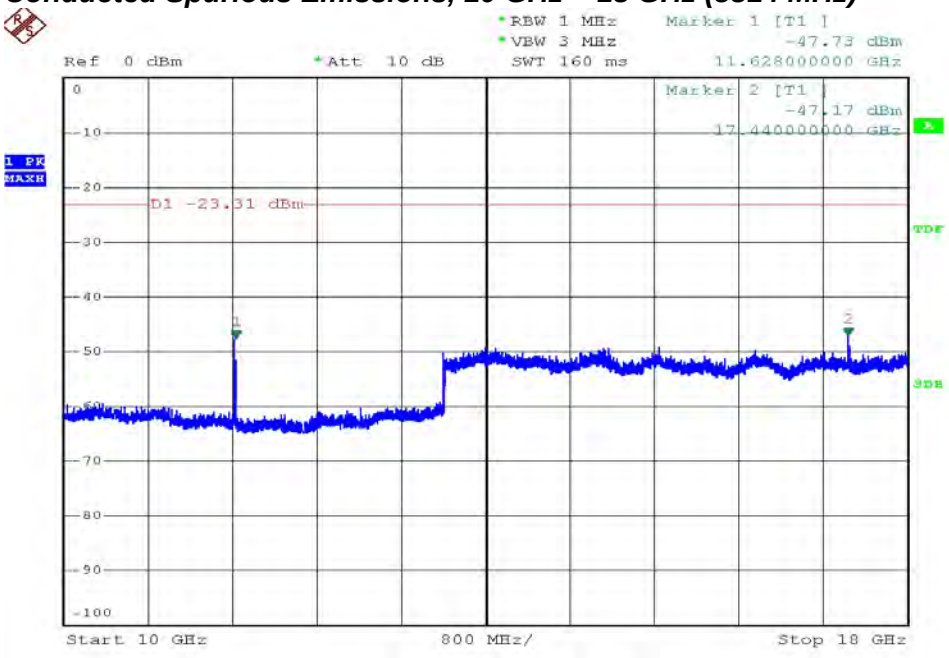


Conducted Spurious Emissions, 5 GHz ~ 10 GHz (5814 MHz)

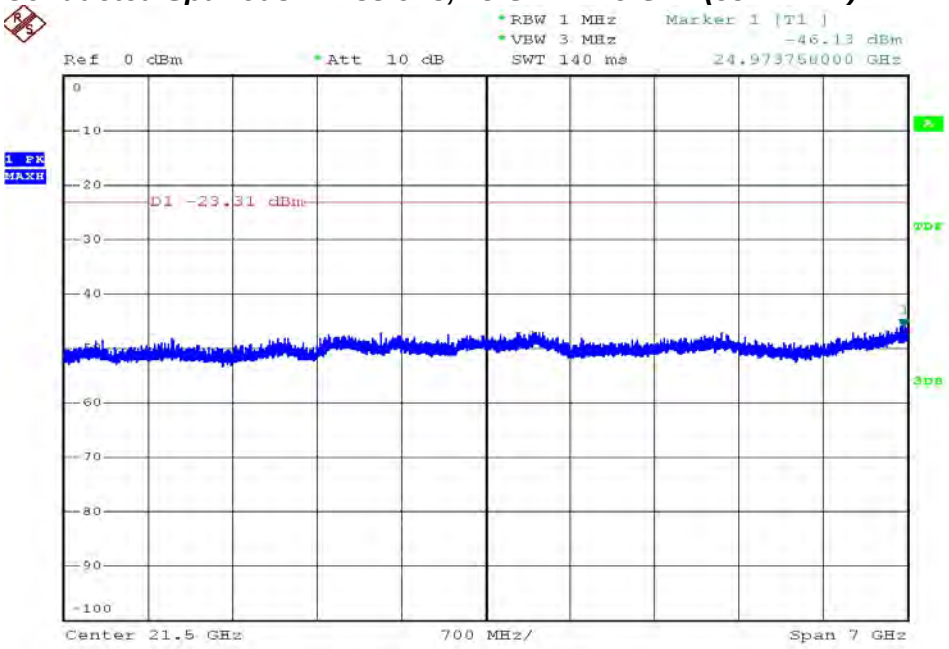


PLOT OF TEST DATA

Conducted Spurious Emissions, 10 GHz ~ 18 GHz (5814 MHz)

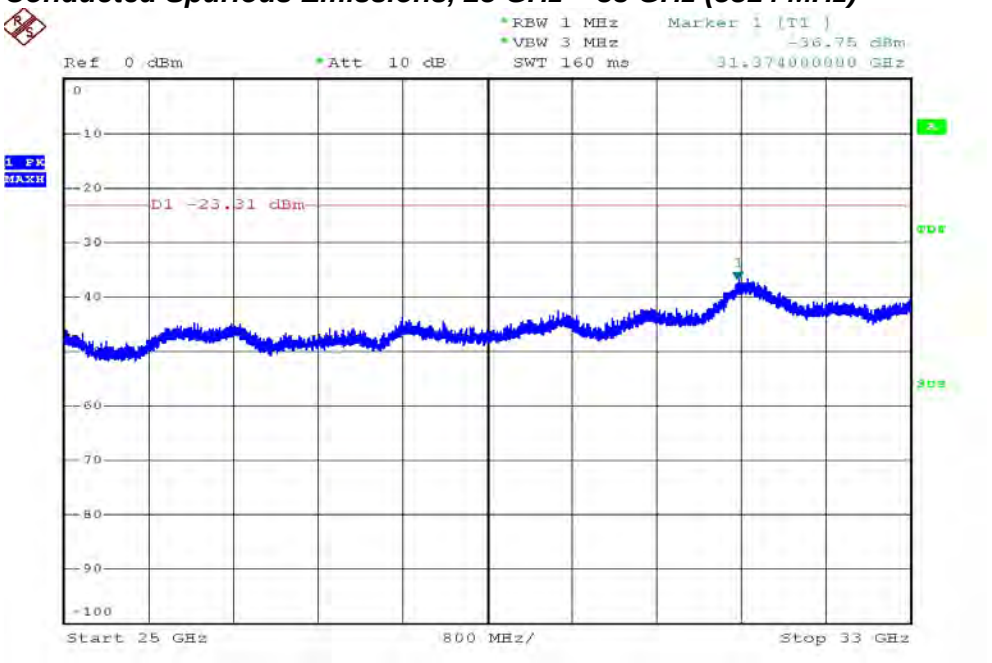


Conducted Spurious Emissions, 18 GHz ~ 25 GHz (5814 MHz)

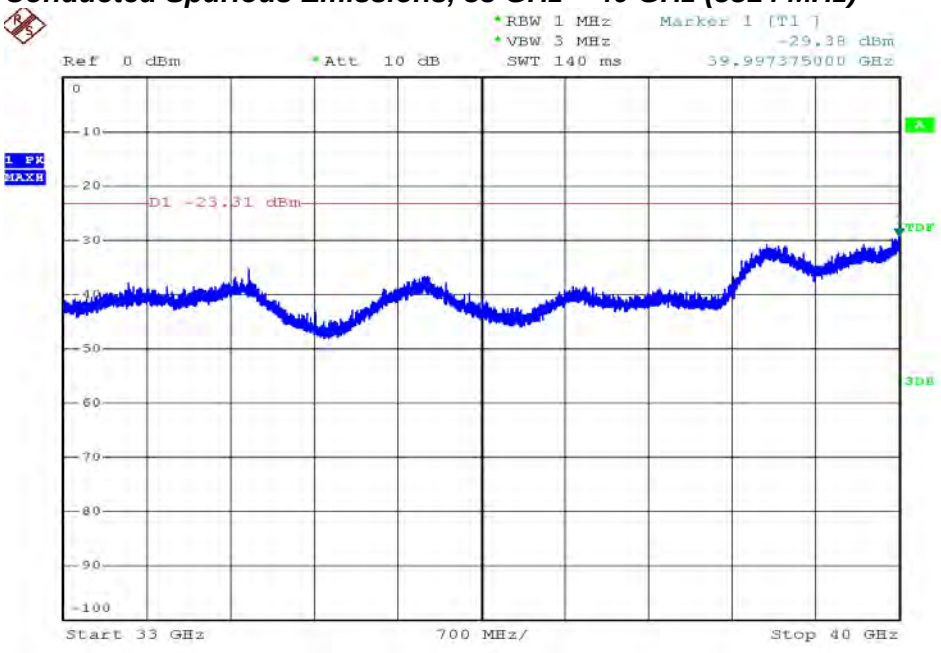


PLOT OF TEST DATA

Conducted Spurious Emissions, 25 GHz ~ 33 GHz (5814 MHz)



Conducted Spurious Emissions, 33 GHz ~ 40 GHz (5814 MHz)

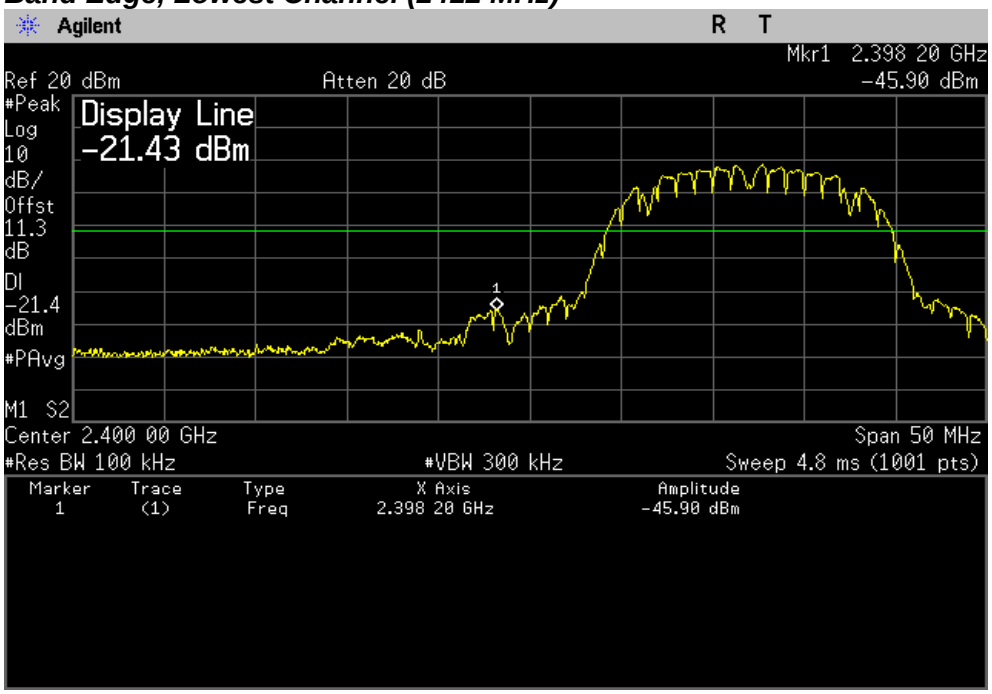


PLOT OF TEST DATA

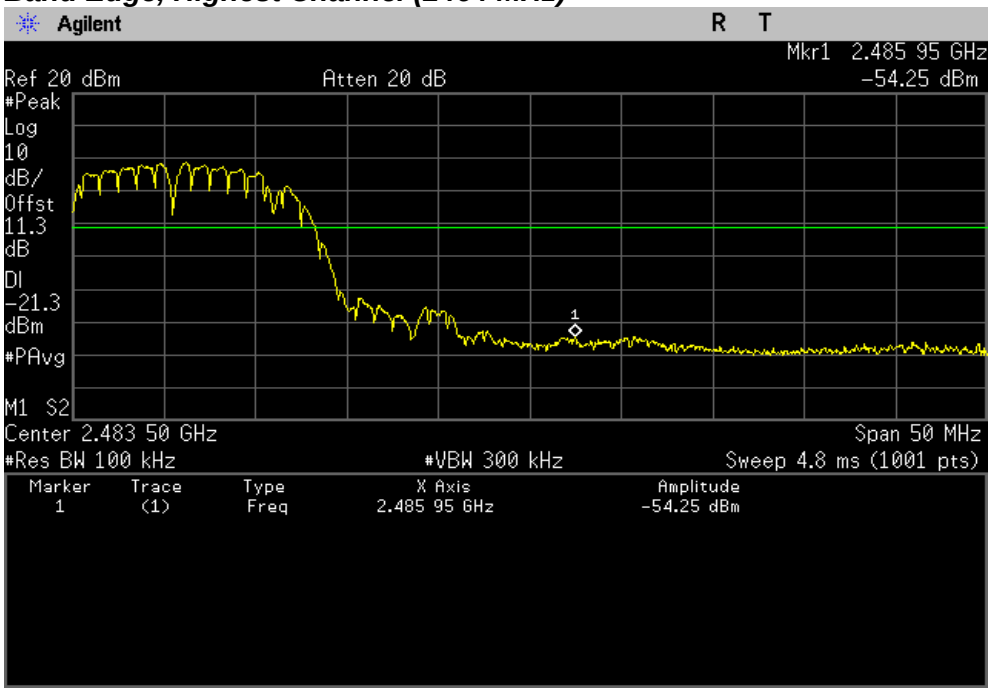
2.4 GHz band

Ant A

Band Edge, Lowest Channel (2412 MHz)



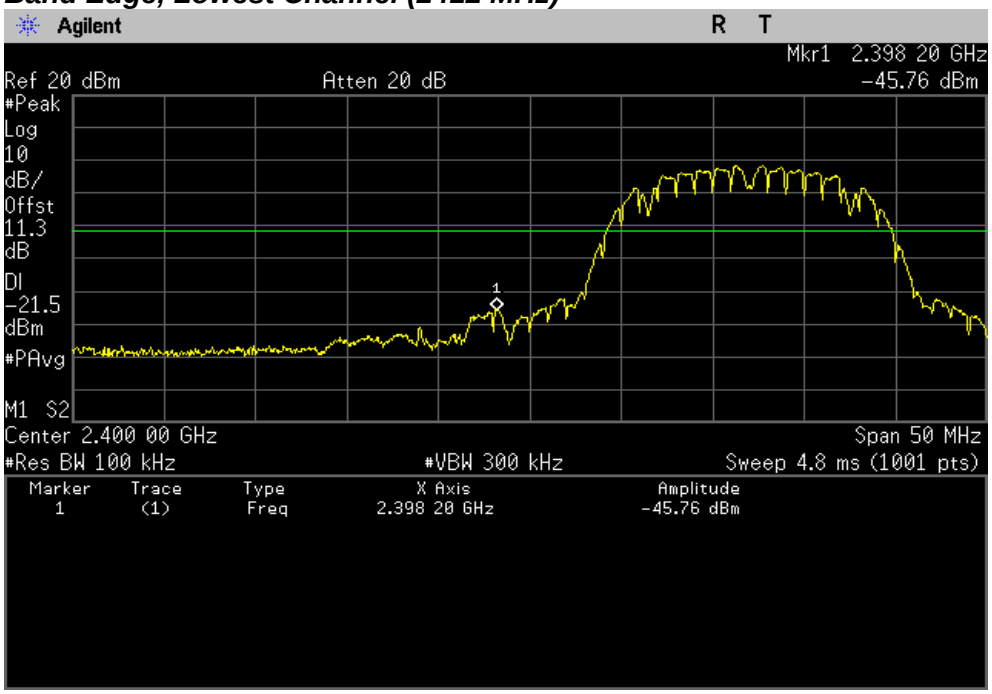
Band Edge, Highest Channel (2464 MHz)



PLOT OF TEST DATA

Ant B

Band Edge, Lowest Channel (2412 MHz)



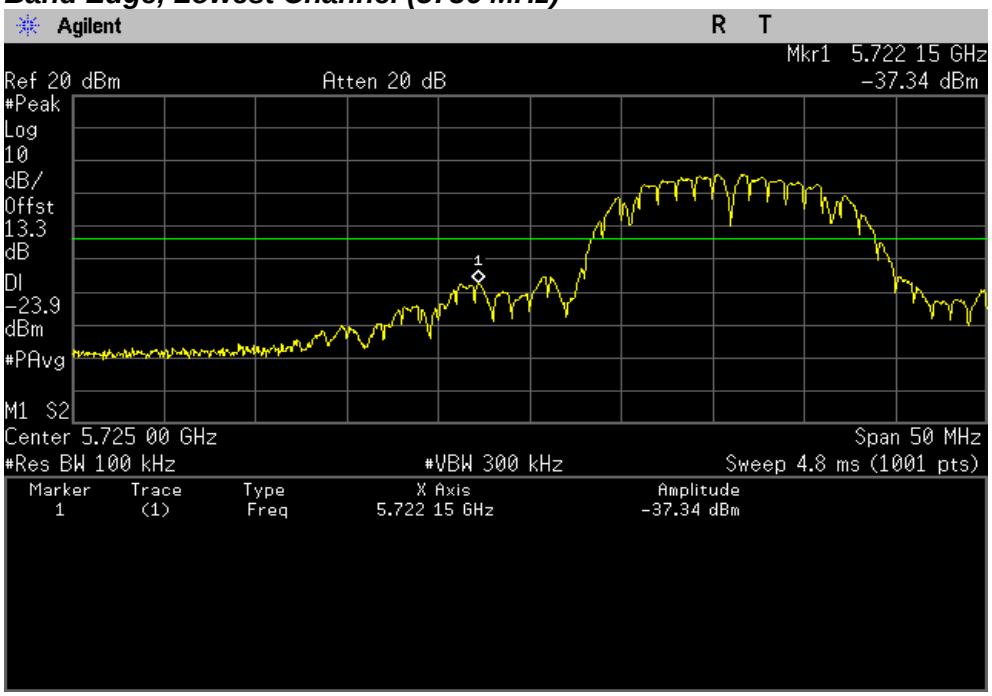
Band Edge, Highest Channel (2464 MHz)

PLOT OF TEST DATA

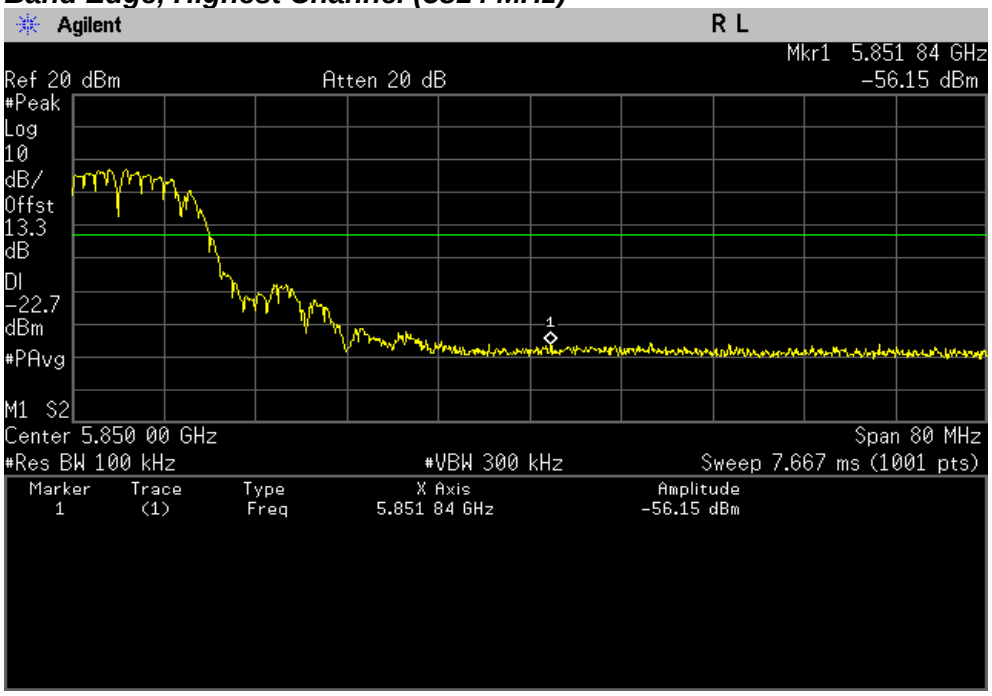
5.8 GHz band

Ant A

Band Edge, Lowest Channel (5736 MHz)



Band Edge, Highest Channel (5814 MHz)



PLOT OF TEST DATA

Ant B

Band Edge, Lowest Channel (5736 MHz)

Band Edge, Highest Channel (5814 MHz)

8.7 Radiated Spurious Emissions

FCC §15.247(d) / IC RSS-210 Issue 8, A8.5

Test Mode : Lowest channel, Middle channel and Highest channel

2.4 GHz mode

Ant A 2.4 GHz mode

Lowest Channel

Frequency (GHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
1324.00	44.80	H	peak	-4.00	40.80	74.0	33.20
1324.00	37.20	H	average	-4.00	33.20	54.0	20.80
1497.25	46.10	H	peak	-3.70	42.40	74.0	31.60
1497.25	37.80	H	average	-3.70	34.10	54.0	19.90
1660.75	45.50	H	peak	-3.20	42.30	74.0	31.70
1660.75	37.10	H	average	-3.20	33.90	54.0	20.10
1690.50	44.80	V	peak	-3.10	41.70	74.0	32.30
1690.50	35.90	V	average	-3.10	32.80	54.0	21.20
2247.50	45.70	V	peak	-1.40	44.30	74.0	29.70
2247.50	37.80	V	average	-1.40	36.40	54.0	17.60
4823.75	39.40	H	peak	9.00	48.40	74.0	25.60
4823.75	31.70	H	average	9.00	40.70	54.0	13.30

Middle Channel

Frequency (GHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
1497.75	46.70	V	peak	-3.70	43.00	74.0	31.00
1497.75	38.10	V	average	-3.70	34.40	54.0	19.60
1663.75	48.60	V	peak	-3.20	45.40	74.0	28.60
1663.75	39.10	V	average	-3.20	35.90	54.0	18.10
1696.50	46.90	V	peak	-3.10	43.80	74.0	30.20
1696.50	37.50	V	average	-3.10	34.40	54.0	19.60
2247.50	45.90	V	peak	-1.40	44.50	74.0	29.50
2247.50	37.20	V	average	-1.40	35.80	54.0	18.20
4876.25	40.80	H	peak	9.40	50.20	74.0	23.80
4876.25	31.50	H	average	9.40	40.90	54.0	13.10
7311.25	39.70	H	peak	16.30	56.00	74.0	18.00
7311.25	31.10	H	average	16.30	47.40	54.0	6.60

Highest Channel

Frequency (GHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
1328.75	45.50	H	peak	-4.00	41.50	74.0	32.50
1328.75	37.10	H	average	-4.00	33.10	54.0	20.90
1495.25	45.70	V	peak	-3.80	41.90	74.0	32.10
1495.25	37.70	V	average	-3.80	33.90	54.0	20.10
1549.25	50.40	H	peak	-3.60	46.80	74.0	27.20
1549.25	39.20	H	average	-3.60	35.60	54.0	18.40
1701.50	46.10	V	peak	-3.10	43.00	74.0	31.00
1701.50	37.10	V	average	-3.10	34.00	54.0	20.00
2247.50	46.10	V	peak	-1.40	44.70	74.0	29.30
2247.50	37.90	V	average	-1.40	36.50	54.0	17.50
4928.13	39.30	V	peak	9.60	48.90	74.0	25.10
4928.13	32.70	V	average	9.60	42.30	54.0	11.70

Ant B 2.4 GHz mode

Lowest Channel

Frequency (GHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
1328.25	46.70	H	peak	-4.00	42.70	74.0	31.30
1328.25	37.10	H	average	-4.00	33.10	54.0	20.90
1497.50	46.00	V	peak	-3.70	42.30	74.0	31.70
1497.50	37.20	V	average	-3.70	33.50	54.0	20.50
1665.25	49.00	V	peak	-3.20	45.80	74.0	28.20
1665.25	39.50	V	average	-3.20	36.30	54.0	17.70
2247.50	45.40	V	peak	-1.40	44.00	74.0	30.00
2247.50	36.20	V	average	-1.40	34.80	54.0	19.20
4823.75	39.80	H	peak	9.20	49.00	74.0	25.00
4823.75	30.70	H	average	9.20	39.90	54.0	14.10

Middle Channel

Frequency (GHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
1498.50	46.40	V	peak	-3.7	42.70	74.0	31.30
1498.50	37.70	V	average	-3.7	34.00	54.0	20.00
1660.25	53.90	V	peak	-3.2	50.70	74.0	23.30
1660.25	42.50	V	average	-3.2	39.30	54.0	14.70
1721.25	50.10	V	peak	-3.1	47.00	74.0	27.00
1721.25	39.40	V	average	-3.1	36.30	54.0	17.70
2242.50	44.90	V	peak	-1.4	43.50	74.0	30.50
2242.50	37.40	V	average	-1.4	36.00	54.0	18.00
4875.63	39.70	V	peak	9.4	49.10	74.0	24.90
4875.63	31.40	V	average	9.4	40.80	54.0	13.20
7311.88	39.90	V	peak	16.3	56.20	74.0	17.80
7311.88	31.40	V	average	16.3	47.70	54.0	6.30

Highest Channel

Frequency (GHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
1498.50	46.90	V	peak	-3.70	43.20	74.0	30.80
1498.50	37.70	V	average	-3.70	34.00	54.0	20.00
1568.25	46.30	H	peak	-3.50	42.80	74.0	31.20
1568.25	37.90	H	average	-3.50	34.40	54.0	19.60
1671.00	49.90	V	peak	-3.10	46.80	74.0	27.20
1671.00	38.30	V	average	-3.10	35.20	54.0	18.80
1687.50	46.30	V	peak	-3.10	43.20	74.0	30.80
1687.50	38.60	V	average	-3.10	35.50	54.0	18.50
2242.50	46.00	V	peak	-1.40	44.60	74.0	29.40
2242.50	38.30	V	average	-1.40	36.90	54.0	17.10
4928.13	40.60	V	peak	9.60	50.20	74.0	23.80
4928.13	33.60	V	average	9.60	43.20	54.0	10.80

Note(s):

*1. *Pol. H = Horizontal V = Vertical*

*2. **AF + CL + Amp. = Antenna Factor + Cable Loss + Amplifier.*

3. Other spurious are the under 20 dB below Fundamental.

4. The radiated emissions testing were made by rotating EUT through three orthogonal axes and rotating the receive antenna with horizontal, Vertical polarization. The worst data was recorded.

5. For peak measurements, the resolution bandwidth was set to 1 MHz and the video bandwidth was set to 3 MHz.

6. For average measurements, "12.2.5.1 Average Power Measurement Procedures" at "558074 D01 DTS Meas Guidance v03r01" was used.

7. The spectrum was measured from 9 kHz to 10th harmonic and the worst-case emissions were reported. No significant emissions were found beyond the 3rd harmonic for this device.

5.8 GHz mode

Ant A 5.8 GHz mode

Lowest Channel

Frequency (GHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Distance (dB)***	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
11.472	46.58	H	peak	6.67	-6.02	47.23	74.0	26.77
11.472	42.06	H	average	6.67	-6.02	42.71	54.0	11.29
11.472	48.94	V	peak	6.67	-6.02	49.59	74.0	24.41
11.472	44.84	V	average	6.67	-6.02	45.49	54.0	8.51

Middle Channel

Frequency (GHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Distance (dB)***	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
11.524	47.84	H	peak	6.87	-6.02	48.69	74.0	25.31
11.524	43.33	H	average	6.87	-6.02	44.18	54.0	9.82
11.524	49.78	V	peak	6.87	-6.02	50.63	74.0	23.37
11.524	45.87	V	average	6.87	-6.02	46.72	54.0	7.28

Highest Channel

Frequency (GHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Distance (dB)***	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
11.628	49.30	H	peak	6.64	-6.02	49.92	74.0	24.08
11.628	45.78	H	average	6.64	-6.02	46.40	54.0	7.60
11.628	50.47	V	peak	6.64	-6.02	51.09	74.0	22.91
11.628	47.33	V	average	6.64	-6.02	47.95	54.0	6.05

Ant B_5.8 GHz mode

Lowest Channel

Frequency (GHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Distance (dB)***	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
11.472	44.41	H	peak	6.67	-6.02	45.06	74.0	28.94
11.472	36.94	H	average	6.67	-6.02	37.59	54.0	16.41
11.472	44.62	V	peak	6.67	-6.02	45.27	74.0	28.73
11.472	36.44	V	average	6.67	-6.02	37.09	54.0	16.91

Middle Channel

Frequency (GHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Distance (dB)***	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
11.524	45.51	H	peak	6.87	-6.02	46.36	74.0	27.64
11.524	36.94	H	average	6.87	-6.02	37.79	54.0	16.21
11.524	44.98	V	peak	6.87	-6.02	45.83	74.0	28.17
11.524	37.96	V	average	6.87	-6.02	38.81	54.0	15.19

Highest Channel

Frequency (GHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Distance (dB)***	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
11.628	45.22	H	peak	6.64	-6.02	45.84	74.0	28.16
11.628	38.44	H	average	6.64	-6.02	39.06	54.0	14.94
11.628	45.39	V	peak	6.64	-6.02	46.01	74.0	27.99
11.628	39.35	V	average	6.64	-6.02	39.97	54.0	14.03

Note(s):

*1. *Pol. H = Horizontal V = Vertical*

*2. **AF + CL + Amp. = Antenna Factor + Cable Loss + Amplifier.*

*3. ***Distance factor = 20 log (test distance/specific distance) = 20 log (1.5 / 3)*

4. Other spurious are under 20 dB below Fundamental.

5. The radiated emissions testing were made by rotating EUT through three orthogonal axes and rotating

the receive antenna with horizontal, Vertical polarization. The worst data was recorded.

6. *For peak measurements, the resolution bandwidth was set to 1 MHz and the video bandwidth was set to 3 MHz.*
7. *For average measurements, "12.2.5.1 Average Power Measurement Procedures" at "558074 D01 DTS Meas Guidance v03r01" was used.*
8. *The spectrum was measured from 9 kHz to 10th harmonic and the worst-case emissions were reported. No significant emissions were found beyond the 2rd harmonic for this device.*

8.8 Radiated Band Edge

FCC §15.247(d), IC RSS-210 Issue 8, A8.5

Test Mode : Set to Lowest channel and Highest channel

Ant A

Lowest channel

Frequency (MHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
2389.84	53.10	H	peak	-1.00	52.10	74.0	21.90

Highest channel

Frequency (MHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
2484.01	53.20	V	peak	-0.50	52.70	74.0	21.30

Ant B

Lowest channel

Frequency (MHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
2389.90	52.20	H	peak	-1.00	51.20	74.0	22.80

Highest channel

Frequency (MHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
2483.59	52.90	H	peak	-0.50	52.40	74.0	21.60

Note(s):

*1. *Pol. H = Horizontal V = Vertical*

*2. **AF + CL + Amp. = Antenna Factor + Cable Loss + Amplifier.*

3. The radiated emissions testing were made by rotating EUT through three orthogonal axes and rotating the receive antenna with horizontal, Vertical polarization. The worst data was recorded.

4. For peak measurements, the resolution bandwidth was set to 1 MHz and the video bandwidth was set to 3 MHz.
5. For average measurements, "12.2.5.1 Average Power Measurement Procedures" at "558074 D01 DTS Meas Guidance v03r01" was used.

9. TEST EQUIPMENT

No.	Instrument	Manufacturer	Model	Serial No.	Calibration Date	Calibration Interval
1	*Test Receiver	R & S	ESCS 30	833364/020	Jan. 09 2013	1 year
2	*Test Receiver	R & S	ESCS 30	100302	Oct. 08 2012	1 year
3	*Amplifier	HP	8447F	2805A03427	Jul. 17 2012	1 year
4	*Amplifier	Sonoma Instrument	310N	291916	Jul. 16 2012	1 year
5	*Amplifier	R & S	SCU18	10065	Apr. 05 2013	1 year
6	*Amplifier	R & S	SCU26	10011	**Jun. 01 2012	1 year
7	*Amplifier	R & S	SCU40	10008	**Jun. 01 2012	1 year
8	*Pre Amplifier	HP	8449B	3008A00107	Jan. 09 2013	1 year
9	*Pre Amplifier	HP	8447F	2805A03351	Jul. 17 2012	1 year
10	*Spectrum Analyzer	Agilent	E4440A	MY44303257	Jul. 16 2012	1 year
11	*Spectrum Analyzer	Agilent	E4440A	MY44022567	Apr. 05 2013	1 year
12	*Spectrum Analyzer	R & S	FSP40	100361	Jul. 17 2012	1 year
13	*Loop Antenna	R & S	HFH2-Z2	100279	Feb. 21 2012	2 year
14	Wideband Power Sensor	R & S	NRP-Z81	100634	Sep 22 2012	1 year
15	*Biconical Log Antenna	ARA	LPB-2520/A	1180	Apr. 26 2012	2 year
16	*Horn Antenna	SCHWARZBECK	BBHA9120D	9120D-474	Aug. 13 2012	2 year
17	*Horn Antenna	Q-par Angus	QSH20S20	8179	Mar. 20 2013	2 year
18	*Horn Antenna	Q-par Angus	QSH22K20	8180	Mar. 20 2013	2 year
19	Trilog-Broadband Antenna	SCHWARZBECK	VULB 9163	9163-454	Feb. 24 2012	2 year
20	*Trilog-Broadband Antenna	SCHWARZBECK	VULB 9168	9168-257	Apr. 26 2012	2 year
21	*LISN	R & S	ESH3-Z5	833874/006	Oct. 08 2012	1 year
22	LISN	R & S	ESH2-Z5	100227	Apr. 04 2013	1 year
23	*DC Power Supply	UNICORN	UP-100DT	9668IP	Oct. 09 2013	N/A
24	*Position Controller	DAEIL EMC	N/A	N/A	N/A	N/A
25	*Turn Table	DAEIL EMC	N/A	N/A	N/A	N/A
26	*Antenna Mast	DAEIL EMC	N/A	N/A	N/A	N/A
27	*Anechoic Chamber	EM Eng.	N/A	N/A	N/A	N/A
28	*Shielded Room	EM Eng.	N/A	N/A	N/A	N/A
29	*Position Controller	Seo-Young EMC	N/A	N/A	N/A	N/A
30	*Turn Table	Seo-Young EMC	N/A	N/A	N/A	N/A
31	*Antenna Mast	Seo-Young EMC	N/A	N/A	N/A	N/A
32	*Anechoic Chamber	Seo-Young EMC	N/A	N/A	N/A	N/A
33	*Shielded Room	Seo-Young EMC	N/A	N/A	N/A	N/A

Note(s)

*1. * Test equipment used during the test*

*2. ** These equipments were not used to test after June 1, 2013.*

10. ACCURACY OF MEASUREMENT

The Measurement Uncertainties stated were calculated in accordance with the requirements of measurement uncertainty contained in CISPR 16-4-2 with the confidence level of 95%.

1. Conducted Uncertainty Calculation

Source of Uncertainty	Xi	Uncertainty of Xi		Coverage factor k	u(Xi) (dB)	Ci	Ci u(Xi) (dB)
		Value (dB)	Probability Distribution				
Receiver reading	RI	± 0.1	normal 1	1.000	0.1	1	0.1
Attenuation AMN-Receiver	LC	± 0.08	normal 2	2.000	0.04	1	0.04
AMN Voltage division factor	LAMN	± 0.8	normal 2	2.000	0.4	1	0.4
Sine wave voltage	dVSW	± 2.00	normal 2	2.000	1.00	1	1.00
Pulse amplitude response	dVPA	± 1.50	rectangular	1.732	0.87	1	0.87
Pulse repetition rate response	dVPR	± 1.50	rectangular	1.732	0.87	1	0.87
Noise floor proximity	dVNF	± 0.00	-	-	0.00	1	0.00
AMN Impedance	dZ	± 1.80	triangular	2.449	0.73	1	0.73
ⓐ Mismatch	M	+ 0.70	U-Shaped	1.414	0.49	1	0.49
ⓑ Mismatch	M	- 0.80	U-Shaped	1.414	- 0.56	1	- 0.56
Measurement System Repeatability	RS	0.05	normal 1	1.000	0.05	1	0.05
Remark	ⓐ: AMN-Receiver Mismatch : + ⓑ: AMN-Receiver Mismatch : -						
Combined Standard Uncertainty	Normal			± 1.88			
Expended Uncertainty U	Normal (k = 2)			± 3.76			

2. Radiation Uncertainty Calculation

Source of Uncertainty	***Xi***	**Uncertainty of *Xi***		**Coverage factor *k***	***u(Xi)* (dB)**	***Ci***	***Ci u(Xi)* (dB)**
		Value (dB)	**Probability Distribution**				
Receiver reading	***RI***	± 0.10	normal 1	1.000	0.10	1	0.10
Sine wave voltage	***dVsw***	± 2.00	normal 2	2.000	1.00	1	1.00
Pulse amplitude response	***dVpa***	± 1.50	rectangular	1.732	0.87	1	0.87
Pulse repetition rate response	***dVpr***	± 1.50	rectangular	1.732	0.87	1	0.87
Noise floor proximity	***dVnf***	± 0.50	normal 2	2.000	0.25	1	0.25
Antenna Factor Calibration	***AF***	± 1.50	normal 2	2.000	0.75	1	0.75
Attenuation Antenna-receiver	***CL***	± 0.52	normal 2	2.000	0.26	1	0.26
Antenna Directivity	***AD***	± 1.00	rectangular	1.732	0.58	1	0.58
Antenna Factor Height Dependence	***AH***	± 0.50	rectangular	1.732	0.29	1	0.29
Antenna Phase Centre Variation	***AP***	± 0.30	rectangular	1.732	0.17	1	0.17
Antenna Factor Frequency Interpolation	***AI***	± 0.30	rectangular	1.732	0.17	1	0.17
Site Imperfections	***SI***	± 4.00	triangular	2.449	1.63	1	1.63
Measurement Distance Variation	***DV***	± 0.10	rectangular	1.732	0.06	1	0.06
Antenna Balance	***Dbal***	± 0.90	rectangular	1.732	0.52	1	0.52
Cross Polarisation	***DCross***	± 0.90	rectangular	1.732	0.52	1	0.52
ⓐ Mismatch	***M***	+ 0.25	U-Shaped	1.414	0.18	1	0.18
ⓑ Mismatch	***M***	- 0.26	U-Shaped	1.414	- 0.18	1	- 0.18
ⓒ Mismatch	***M***	+ 0.98	U-Shaped	1.414	0.69	1	0.69
ⓓ Mismatch	***M***	- 1.11	U-Shaped	1.414	- 0.79	1	- 0.79
Measurement System Repeatability	***RS***	0.09	normal 1	1.000	0.09	1	0.09
Remark	ⓐ: Biconical Antenna-receiver Mismatch : + (< 200 MHz) ⓑ: Biconical Antenna-receiver Mismatch : - (< 200 MHz) ⓒ: Log Periodic Antenna-receiver Mismatch : + (≧ 200 MHz) ⓓ: Log Periodic Antenna-receiver Mismatch : - (≧ 200 MHz)						
Combined Standard Uncertainty	Normal			± 2.63 (< 200 MHz) ± 2.74 (≧200 MHz)			
Expended Uncertainty U	Normal (*k* = 2)			± 5.26 (< 200 MHz) ± 5.48 (≧200 MHz)			