



Test Report No.: NK-13-R-079-1

FCC and IC Certification

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 : August 21, 2013
Test Report No. : NK-13-R-079-1
Test Site : Nemko Korea Co., Ltd.

FCC ID
IC

A3LSSG5900
649E-SSG5900

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: 3D Active Glasses

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.


Tested By : Jin-ha Ko
Engineer

Aug. 21, 2013


Reviewed By : Deokha Ryu
Technical Manager

Aug 21, 2013

Samsung Electronics Co., Ltd.

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FCC ID : A3LSSG5900 / IC : 649E-SSG5900

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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: A3LSSG5900
- IC : 649E-SSG5900
- Model: SSG-5900CR
- Brand Name: SAMSUNG
- EUT Type: 3D Active Glasses
- 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 entitled "Guidance for Performing Compliance Measurements on Digital Transmission System (DTS) Operating Under §15.247"
- Dates of Test: April 10, 2013 ~ May 21, 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 : A3LSSG5900 and IC : 649E-SSG5900

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 kilometers (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.

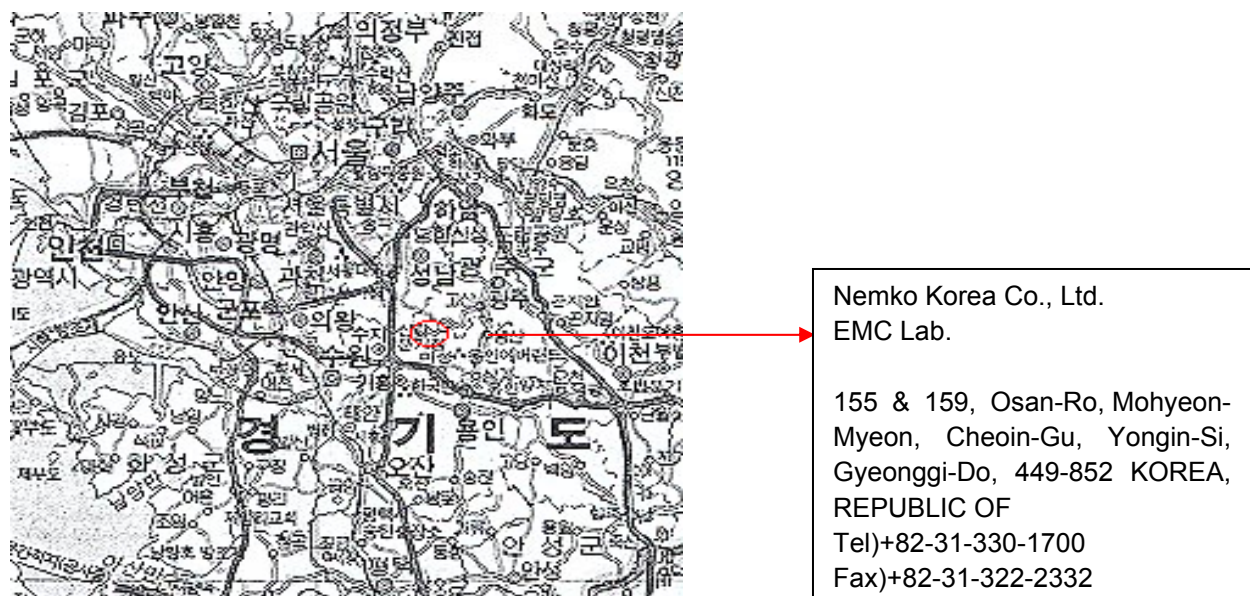


Fig. 1. The map above shows the Seoul in Korea vicinity area.
The map also shows Nemko Korea Corporation Ltd. EMC Lab. and Incheon Airport.

2.2 Accreditation and listing

Accreditation type		Accreditation number
	FCC part 15/18 Filing site	Registration No. 97992
	CAB Accreditation for DOC	Designation No. KR0026
	KOLAS Accredited Lab. (Korea Laboratory Accreditation Scheme)	Registration No. 155
	Canada IC Registered site	Site No. 2040E
	VCCI registration site(RE/CE/Telecom CE)	Member No. 2118
	EMC CBTL	-
	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 Laptop and test Jig were used to control the EUT to transmit the wanted TX channel and maximum output power. The EUT consist of Bluetooth module and Audio module. The Audio transmitter module was controlled by testing program.

After the setting of the maximum transmitting power, the laptop PC and test jig were removed from test area. During the test, the EUT was operating with a duty cycle 100 %.

The EUT was measured at three orthogonal axes and the worst data was recorded.

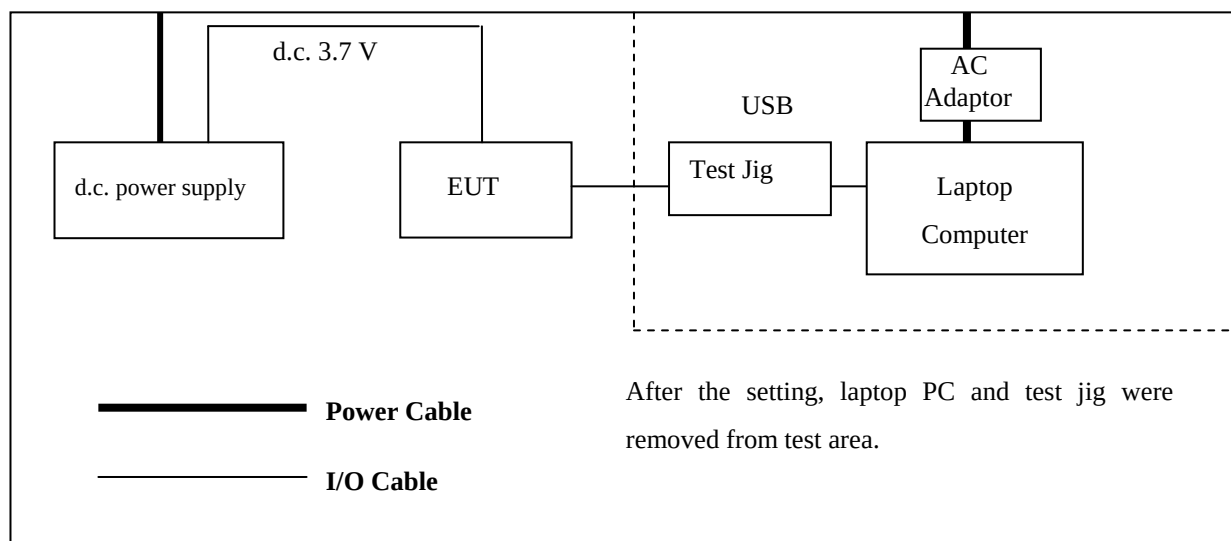
The EUT was programmed with the following power setting that used during the testing:

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

3.2 Support Equipment

EUT	Samsung Electronics Co., Ltd. FCC ID: A3LSSG5900	S/N: N/A
Laptop Computer	Samsung Electronics Co., Ltd. Model : NT-R520 1.2 m shielded USB cable	FCC DOC S/N : ZK6V93FS800012Y
AC/DC Adapter	Chicony Power Technology Co., Ltd. Model : AD-6019R 1.2 m unshielded power cable	FCC DOC S/N : CNBA440024ADON897I2602
d.c. power supply	UNICORN Co.,LTD Model: UP-100DT 1.5 m unshielded power cable	S/N: 9668IP

3.3 Setup Drawing



3.4 EUT Information

The EUT is the **Samsung Active 3D glasses FCC ID: A3LSSG5900, IC: 649E-SSG5900.**

Specifications for Audio transmitting:

Category	Active 3D glasses
Model Name	SSG-5900CR
Brand Name	SAMSUNG
Frequency of Operation	2412 MHz ~ 2464 MHz 5736 MHz ~ 5814 MHz
Power Output (Conducted)	2 GHz band : 11.89 dBm, 5 GHz band : 9.67 dBm
Channels	2 GHz band : 3 ch, 5 GHz band : 3 ch
Antenna Gain (peak)	2 GHz band : 3.1 dBi, 5 GHz band : 4.3 dBi
Modulations	QPSK
Temperature Range	-0 °C ~ +40 °C
Voltage	3.7 Vdc (Lithium battery)
Dimensions (W x H x D)	140 mm x 185 mm X 40 mm
Weight	40 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	N/A	Battery Operation
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	
Peak Power Output	15.247(b)(1)	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	

5. RECOMMENDATION/CONCLUSION

The data collected shows that the **Samsung Active 3D glasses FCC ID: A3LSSG5900, IC: 649E-SSG5900** 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 Active 3D glasses FCC ID: A3LSSG5900, IC: 649E-SSG5900** 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 μ H 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 (serpentine fashion) 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.

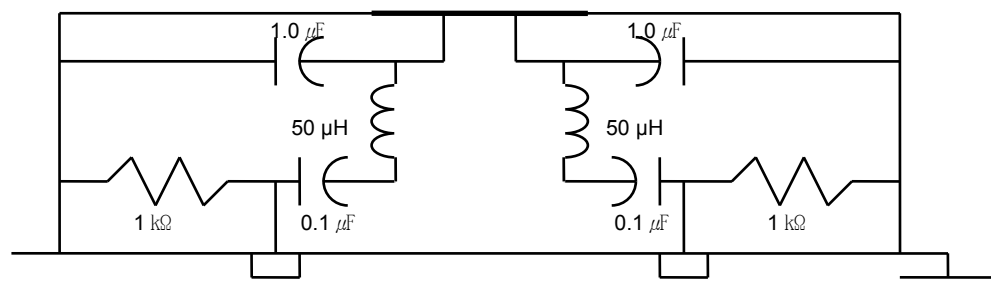


Fig. 2. LISN Schematic Diagram

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.

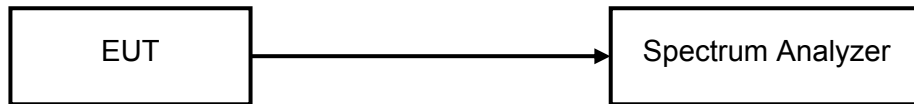
At frequencies above 1000 MHz, measurements performed using the peak and average measurement procedures described in KDB “558074D01 DTS Meas Guidance v03r01” in section 12.2.4 and 12.2.5.1. Peak emission levels were measured by setting the analyzer RBW = 1 MHz, VBW = 3 MHz, Detector = Peak, Trace mode = 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 $\geq$ 3 x RBW

Detector = Peak

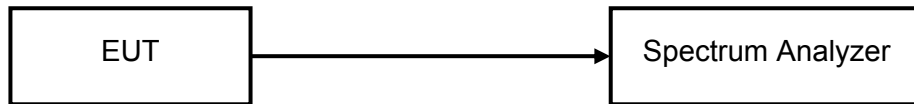
Trace mode = max hold

Sweep = auto couple

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

7.4 Maximum Conducted Output Power

Test Setup



Test Procedure

EUTs Maximum 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.

Span = at least 1.5 times the OBW

RBW = 1-5% of the OBW, not to exceed 1 MHz

VBW $\geq 3 \times$ RBW

Number of points in the sweep $\geq 2 \times$ span / RBW

Sweep time = auto couple

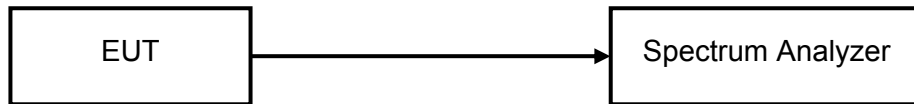
Detector = RMS

Employ trace averaging in power averaging (RMS) mode over a minimum of 100 traces.

The band power measurement function with band limits set to equal to the OBW band edge.

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 : $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$

VBW $\geq 3 \times \text{RBW}$

Detector = peak

Sweep time = auto couple

Trace mode = max hold

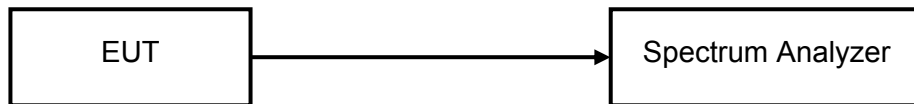
Allow trace to fully stabilize.

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 $\geq$ 1.5 times the DTS bandwidth

RBW = 100 kHz

VBW $\geq$ 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

RBW = 100 kHz

VBW $\geq$ 300 kHz

Span = encompass the spectrum to be examined

Detector = peak

Sweep time = auto couple

The amplitude of all unwanted emissions outside of the authorized frequency band is confirmed that it is attenuated by at least the minimum requirements specified.

8. TEST DATA

8.1 Radiated Emissions

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

2.4 GHz mode (Audio transmitting)

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)
31.46	42.3	V	147	207	-18.0	24.3	40.0	15.7
40.21	36.3	V	102	146	-17.0	19.3	40.0	20.7
117.36	37.3	V	156	27	-19.9	17.4	43.5	26.1
175.99	35.5	H	317	219	-16.2	19.3	43.5	24.2
219.99	37.6	H	184	336	-19.1	18.5	46.0	27.5
352.00	39.0	H	101	224	-13.6	25.4	46.0	20.6

Radiated Measurements at 3meters

5.8 GHz mode (Audio transmitting)

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)
31.46	40.6	V	101	200	-18.0	22.6	40.0	17.4
42.36	37.0	V	102	158	-17.0	20.0	40.0	20.0
75.17	35.1	V	100	107	-18.9	16.2	40.0	23.8
127.30	34.3	V	105	227	-17.1	17.2	43.5	26.3
175.99	36.0	H	247	230	-16.2	19.8	43.5	23.7
351.99	40.4	H	108	240	-13.6	26.8	46.0	19.2

Radiated Measurements at 3meters

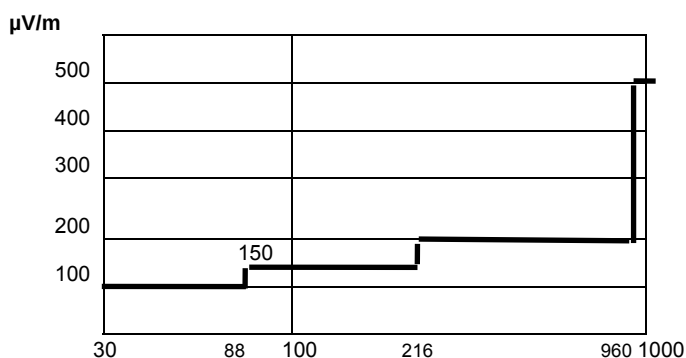


Fig. 3. Limits at 3 meters

Notes:

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.

TEST DATA

8.2 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

Channel	Frequency(MHz)	Result(kHz)	Limit(kHz)	Margin(kHz)
Low	2412	9842	500	9342
Middle	2438	9842	500	9342
High	2464	9844	500	9344

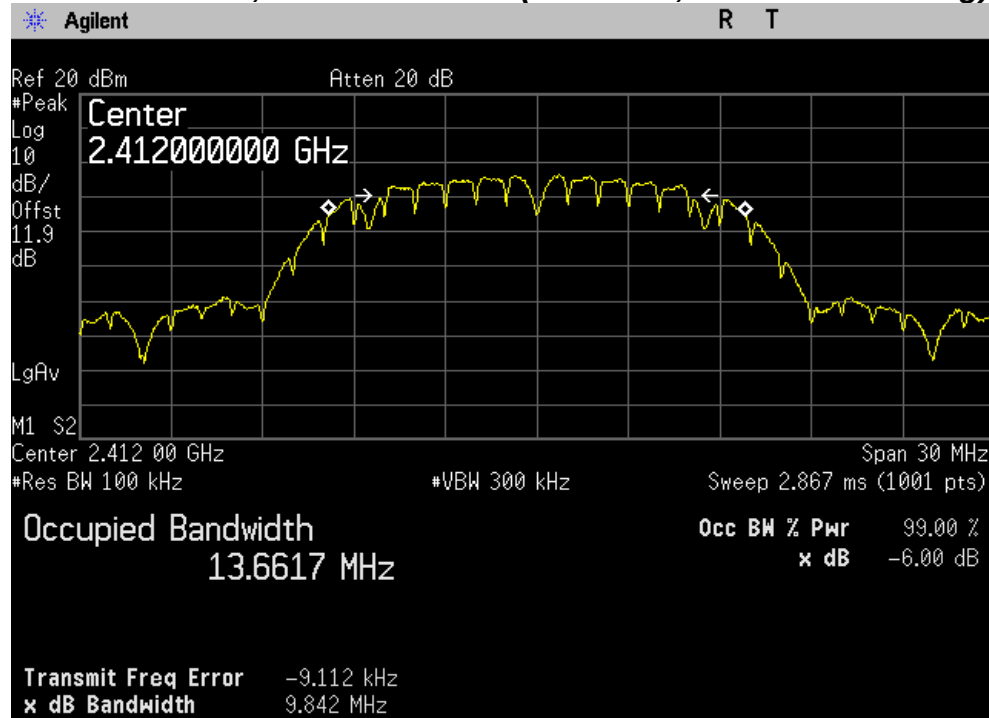
5.8 GHz band

Channel	Frequency(MHz)	Result(kHz)	Limit(kHz)	Margin(kHz)
Low	5736	9840	500	9340
Middle	5762	9842	500	9342
High	5814	9840	500	9340

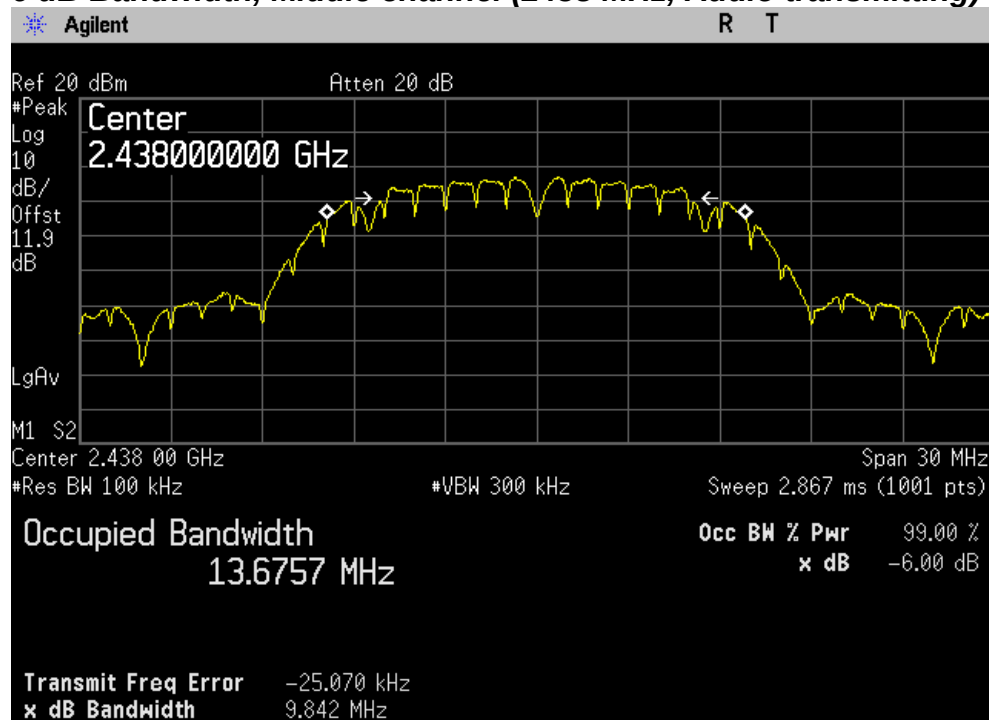
PLOTS OF EMISSIONS

Audio transmitting 2.4 GHz band

6 dB Bandwidth, Lowest channel (2412 MHz, Audio transmitting)

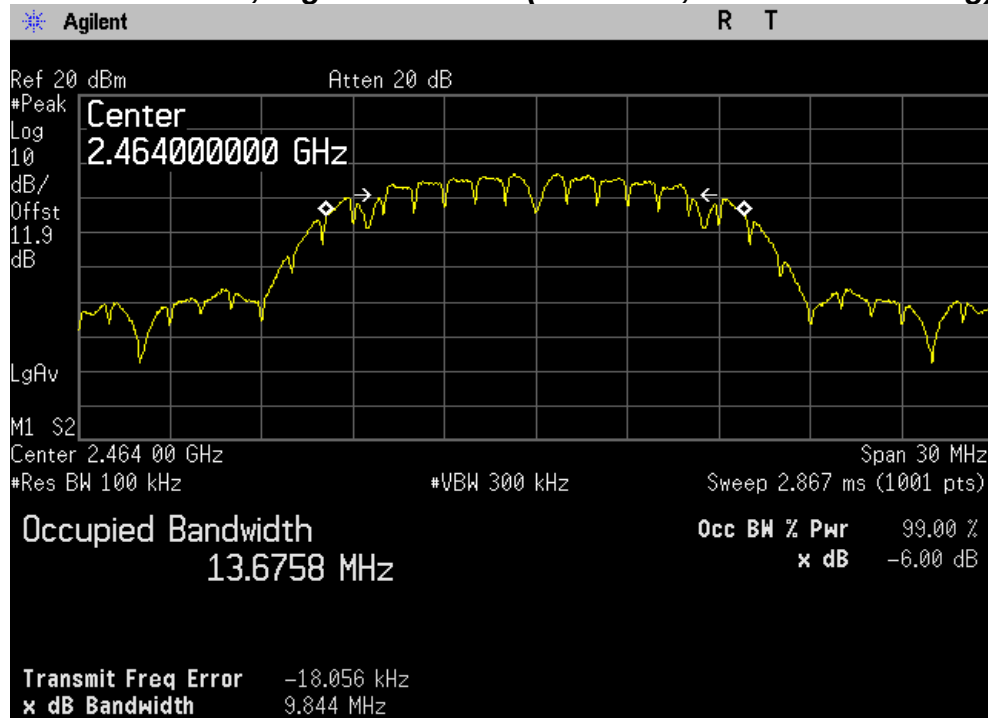


6 dB Bandwidth, Middle channel (2438 MHz, Audio transmitting)



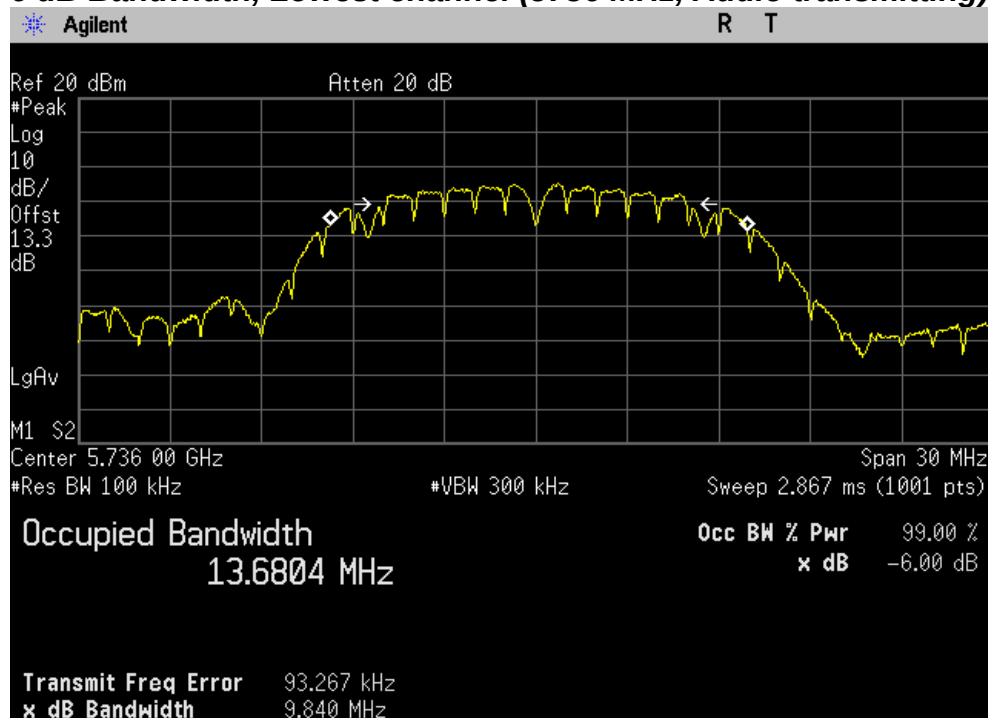
PLOTS OF EMISSIONS

6 dB Bandwidth, Highest channel (2464 MHz, Audio transmitting)



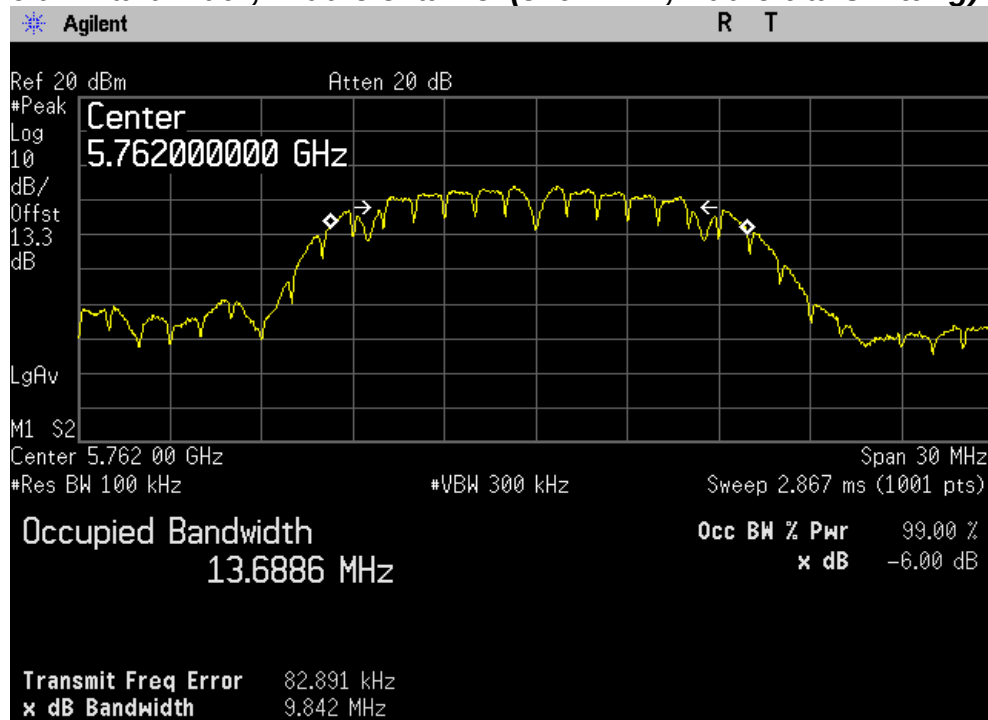
Audio transmitting 5.8 GHz band

6 dB Bandwidth, Lowest channel (5736 MHz, Audio transmitting)

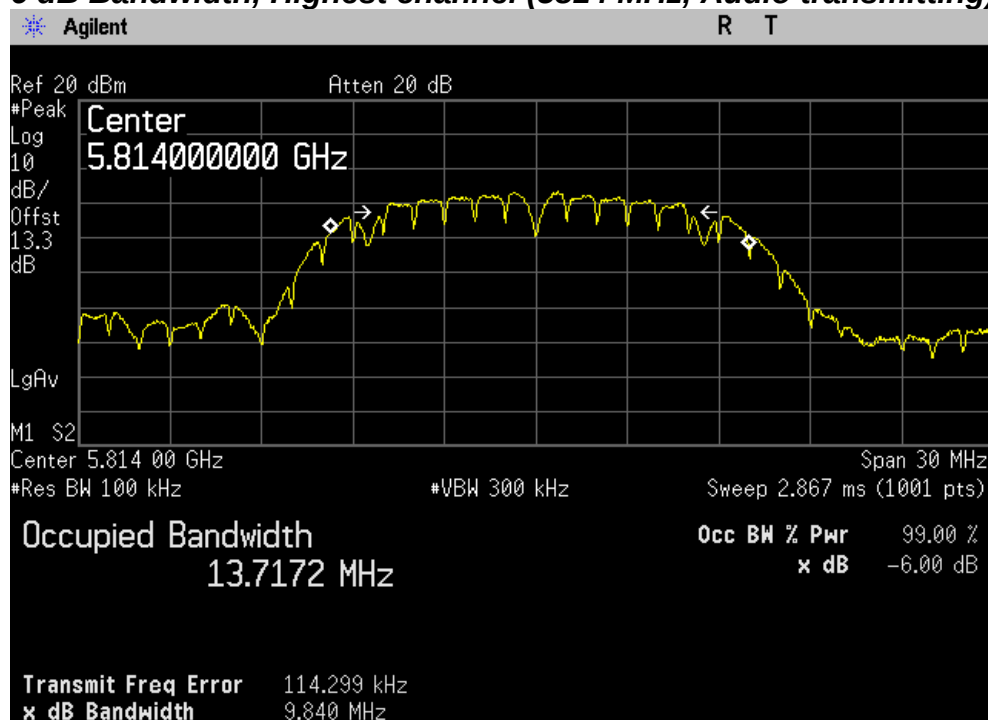


PLOTS OF EMISSIONS

6 dB Bandwidth, Middle channel (5762 MHz, Audio transmitting)



6 dB Bandwidth, Highest channel (5814 MHz, Audio transmitting)



TEST DATA

8.3 Maximum conducted (average) 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 (Audio transmitting)

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2412	11.67	30.00	18.33
Middle	2438	11.85	30.00	18.15
High	2464	11.89	30.00	18.11

5.8 GHz band (Audio transmitting)

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	5736	9.67	30.00	20.33
Middle	5762	8.94	30.00	21.06
High	5814	8.24	30.00	21.76

Note:

The following equation was used for spectrum offset:

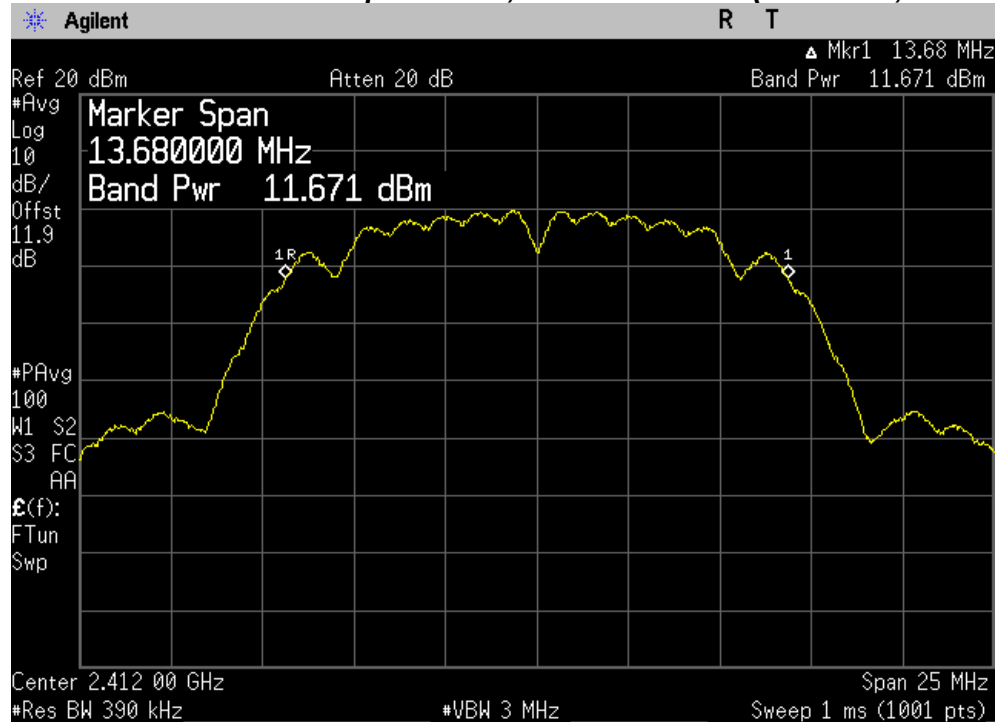
$\text{Spectrum offset (dB)} = \text{Attenuator (dB)} + \text{Cable Loss (dB)} + \text{SMA Type Connector Loss (dB)}$

PLOT OF TEST DATA

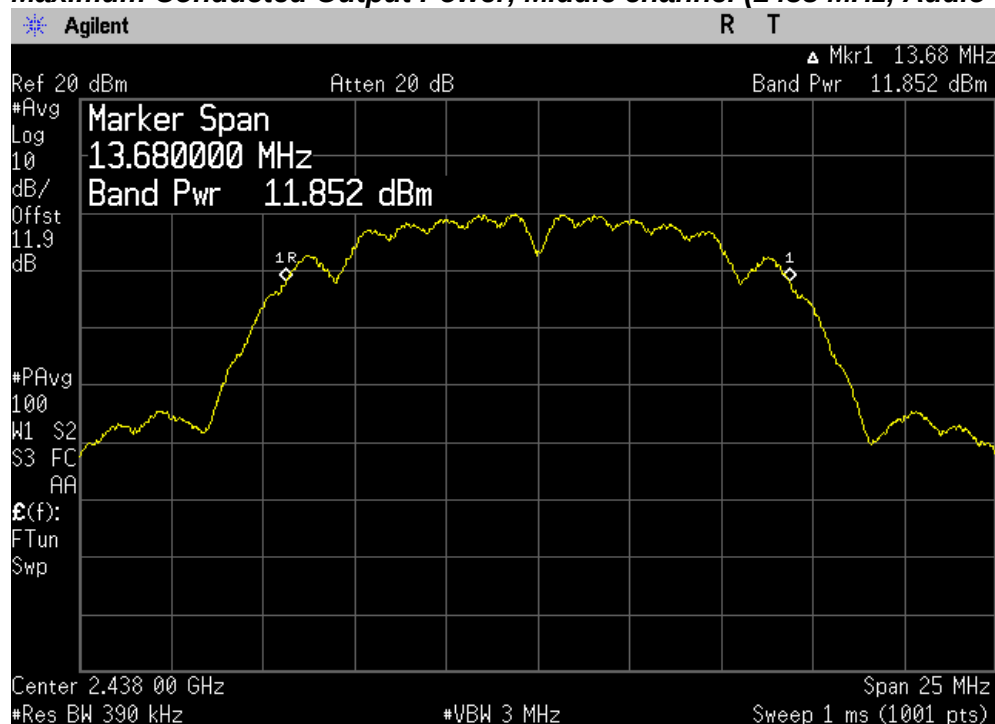
Audio transmitting

2.4 GHz band

Maximum Conducted Output Power, Lowest channel (2412 MHz, Audio transmitting)

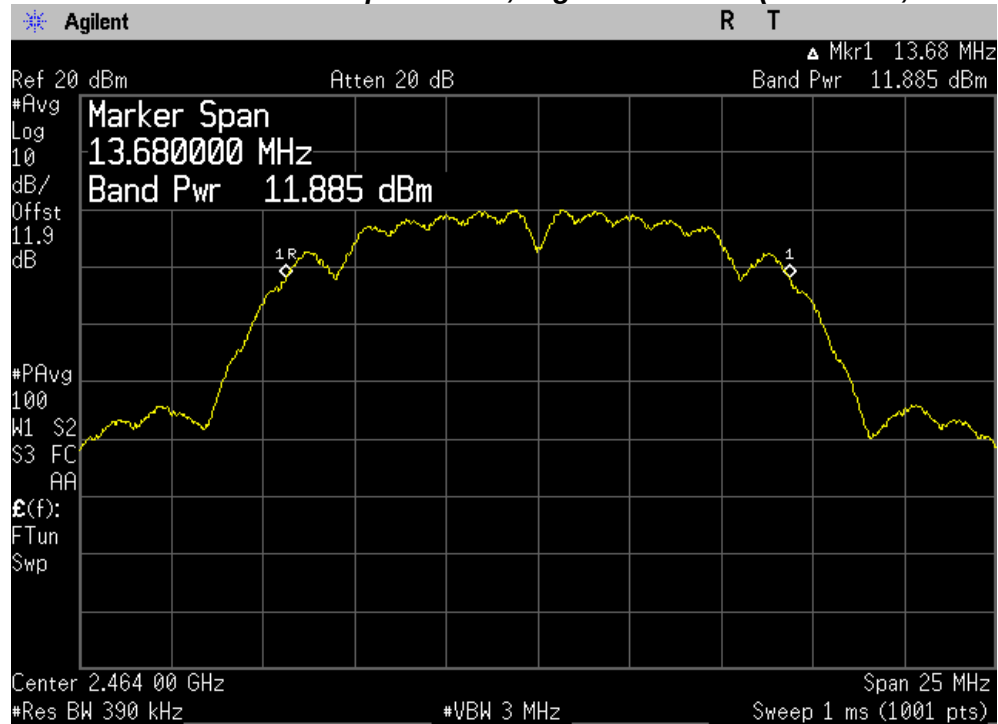


Maximum Conducted Output Power, Middle channel (2438 MHz, Audio transmitting)



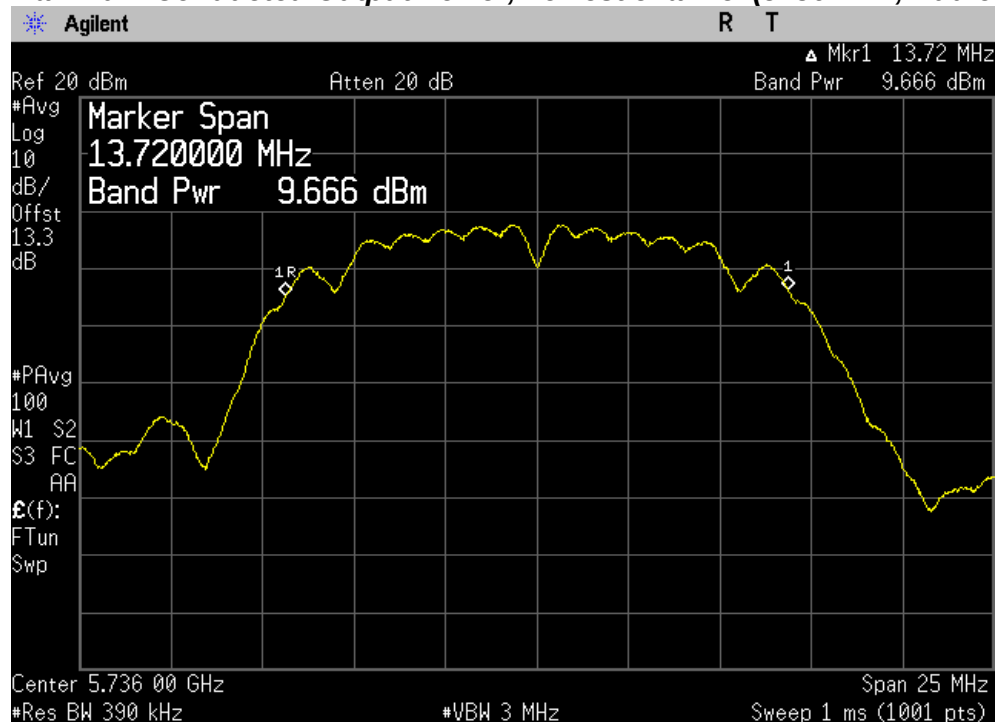
PLOT OF TEST DATA

Maximum Conducted Output Power, Highest channel (2464 MHz, Audio transmitting)



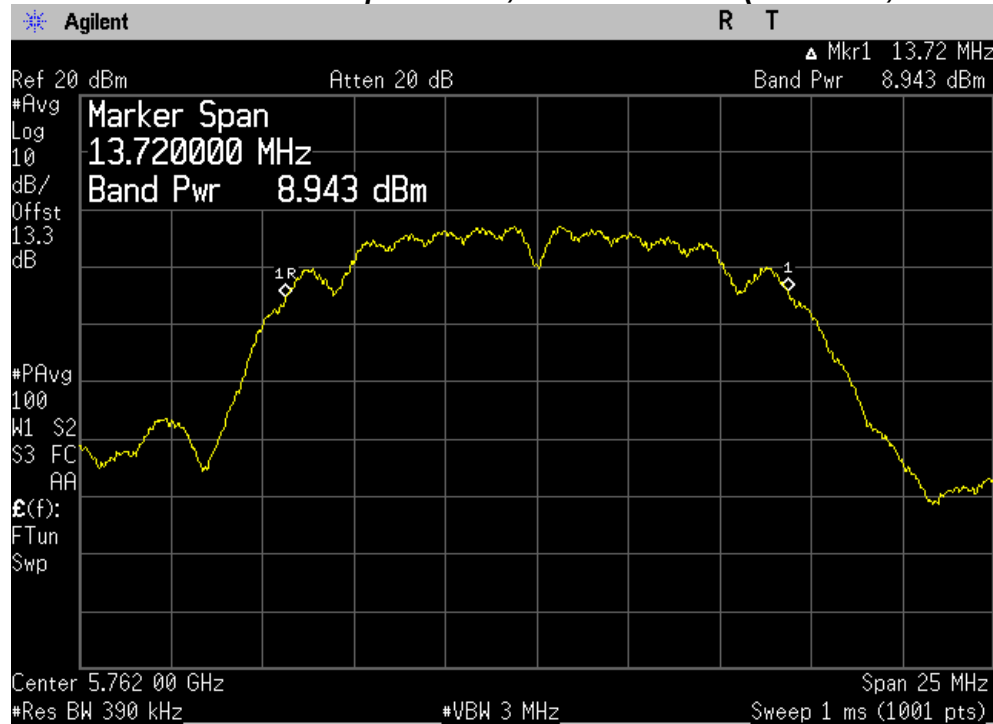
5.8 GHz band

Maximum Conducted Output Power, Lowest channel (5736 MHz, Audio transmitting)

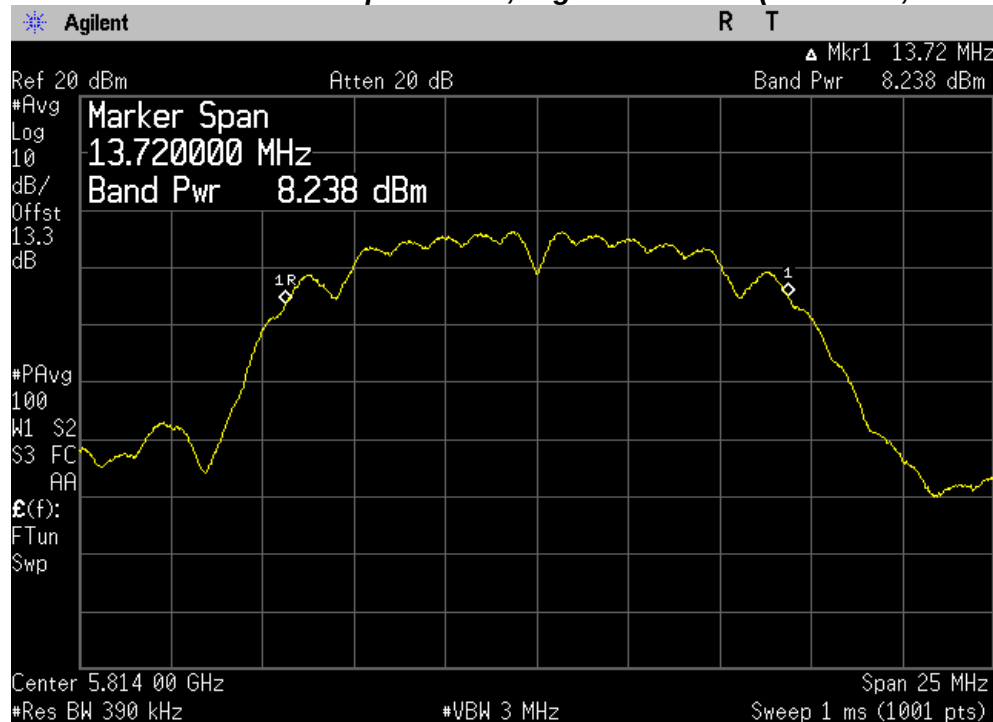


PLOT OF TEST DATA

Maximum Conducted Output Power, Middle channel (5762 MHz, Audio transmitter)



Maximum Conducted Output Power, Highest channel (5814 MHz, Audio transmitting)



TEST DATA

8.4 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 (Audio transmitting)

Channel	Frequency (MHz)	Measured Power Spectral Density (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-3.04	8	11.04
Middle	2438	-2.98	8	10.98
High	2464	-3.06	8	11.06

5.8 GHz band (Audio transmitting)

Channel	Frequency (MHz)	Measured Power Spectral Density (dBm)	Limit (dBm)	Margin (dB)
Low	5736	-4.92	8	12.92
Middle	5762	-5.66	8	13.66
High	5814	-6.57	8	14.57

Note:

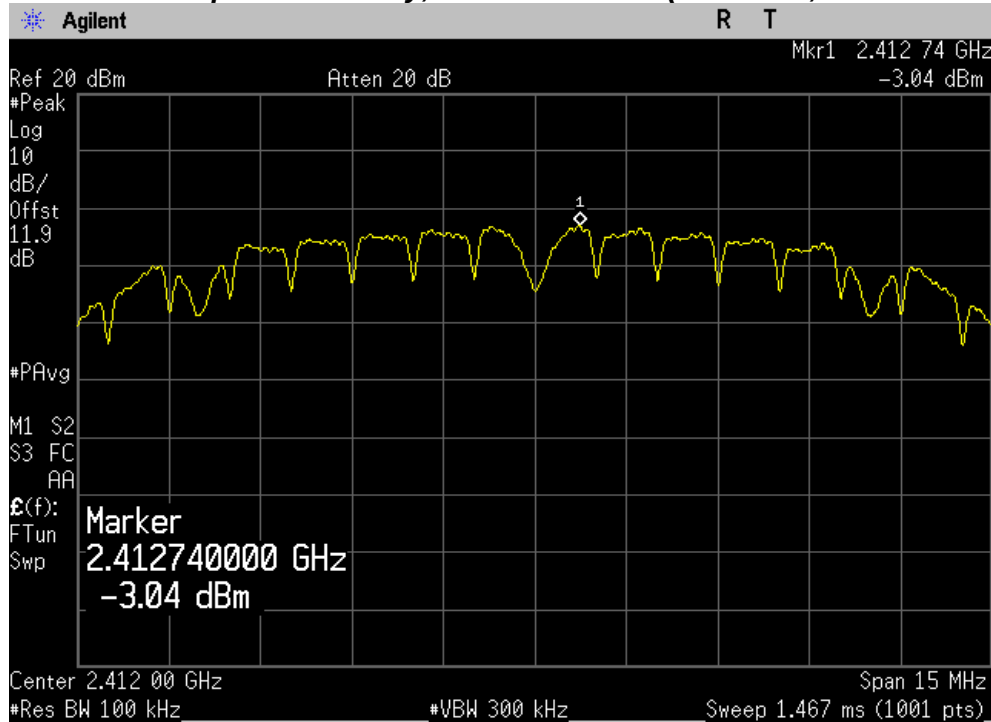
The following equation was used for spectrum offset for Power Spectral Density:

$\text{Spectrum offset (dB)} = \text{Attenuator (dB)} + \text{Cable Loss (dB)} + \text{SMA Type Connector Loss (dB)}$

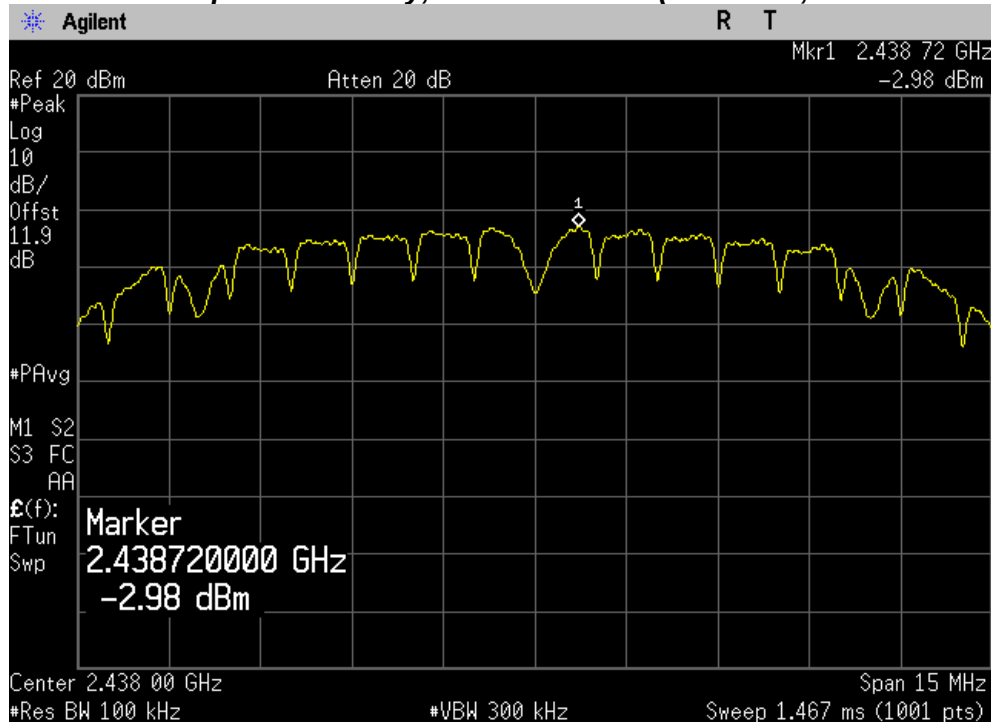
PLOT OF TEST DATA

2.4 GHz band (Audio transmitting)

Peak Power Spectral Density, Lowest channel (2412 MHz, Audio transmitting)

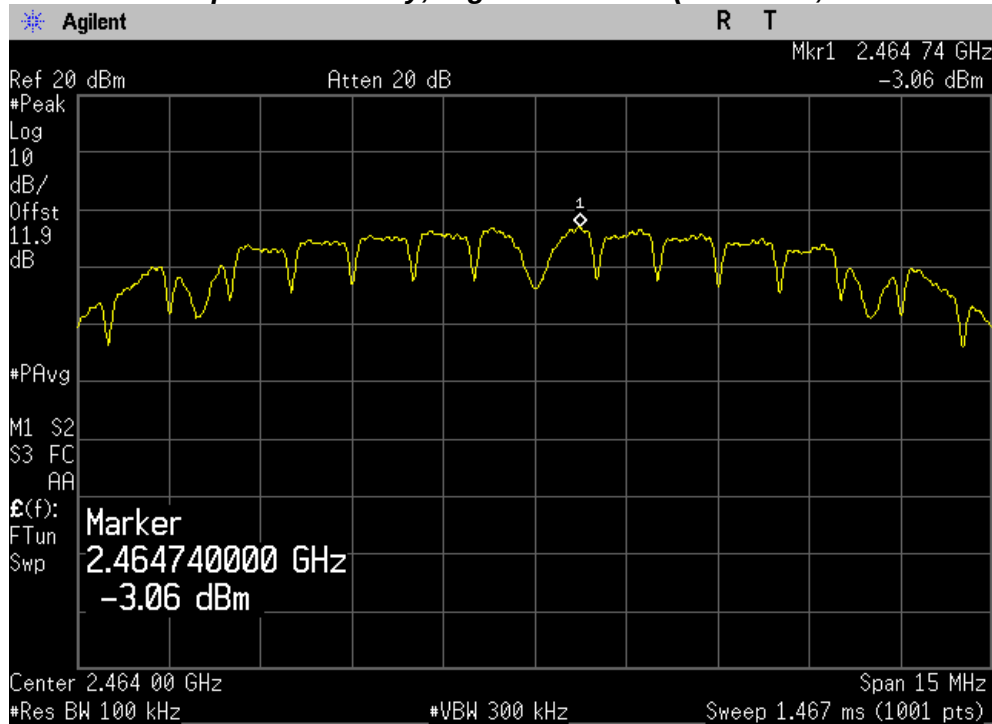


Peak Power Spectral Density, Middle channel (2438 MHz, Audio transmitting)



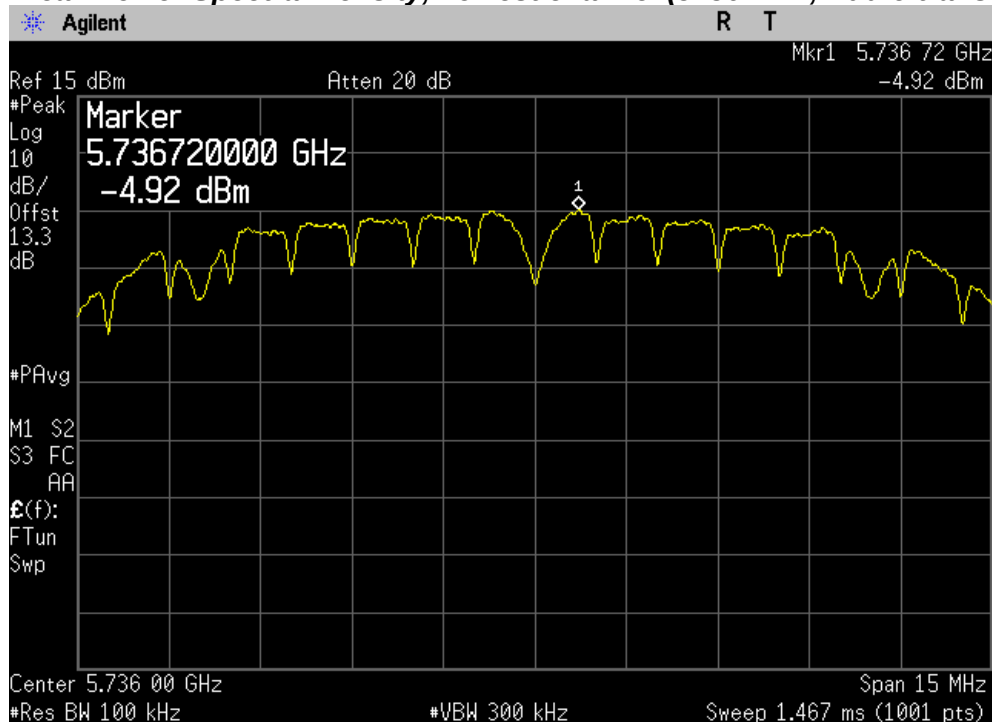
PLOT OF TEST DATA

Peak Power Spectral Density, Highest channel (2464 MHz, Audio transmitting)



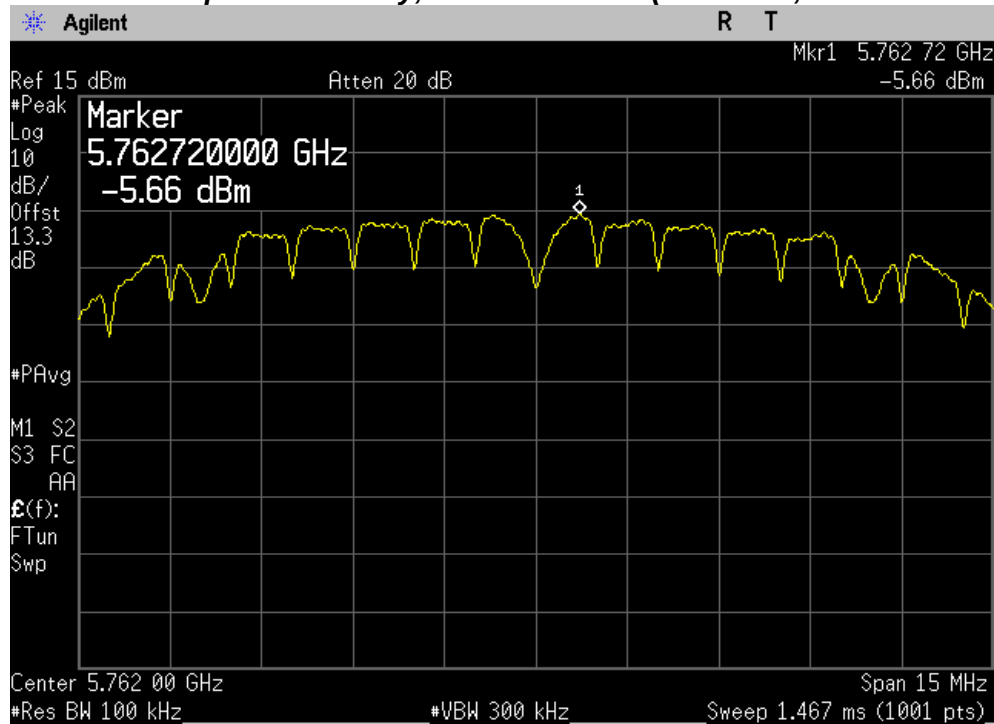
5.8 GHz band (Audio transmitting)

Peak Power Spectral Density, Lowest channel (5736 MHz, Audio transmitting)

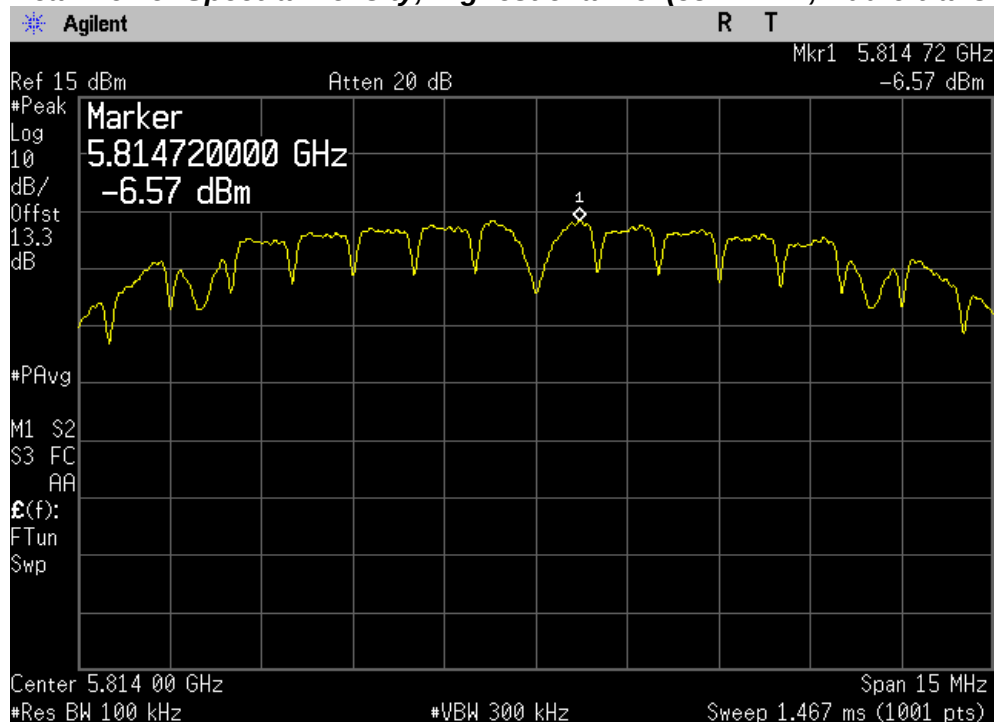


PLOT OF TEST DATA

Peak Power Spectral Density, Middle channel (5762 MHz, Audio transmitting)



Peak Power Spectral Density, Highest channel (5814 MHz, Audio transmitting)



TEST DATA

8.5 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 (Audio transmitting)

Channel	Frequency(MHz)	Result(dBc)	Limit(dBc)
Low	2412	More than 30 dBc	30
Middle	2438	More than 30 dBc	30
High	2464	More than 30 dBc	30

5.8 GHz band (Audio transmitting)

Channel	Frequency(MHz)	Result(dBc)	Limit(dBc)
Low	5736	More than 30 dBc	30
Middle	5762	More than 30 dBc	30
High	5814	More than 30 dBc	30

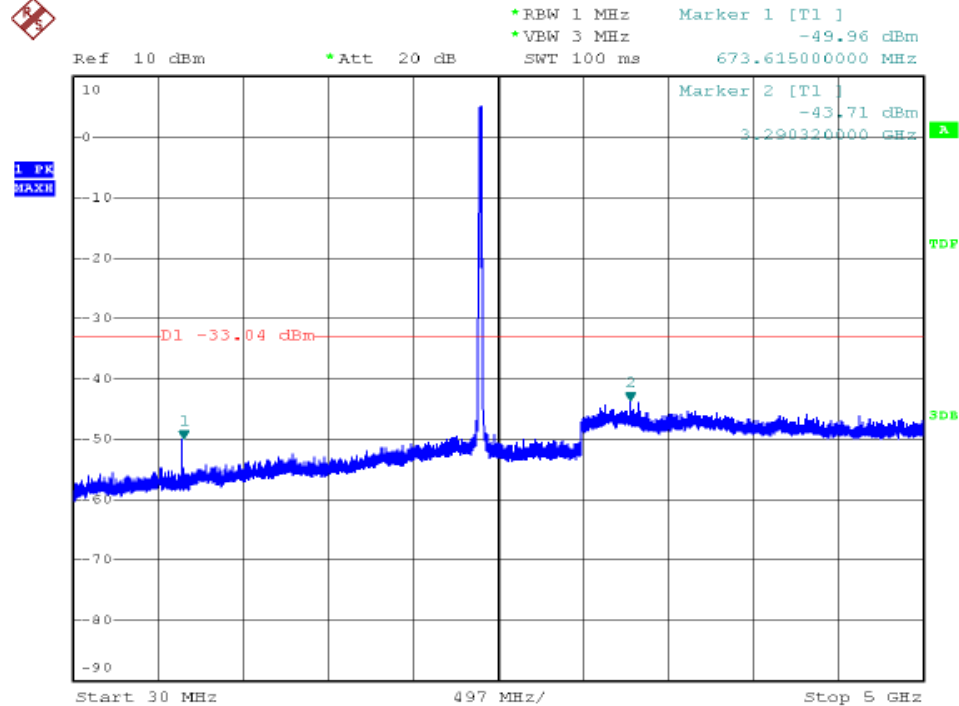
Notes:

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 span.
3. The display line shown in the following plots indicates the limit at 30 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.

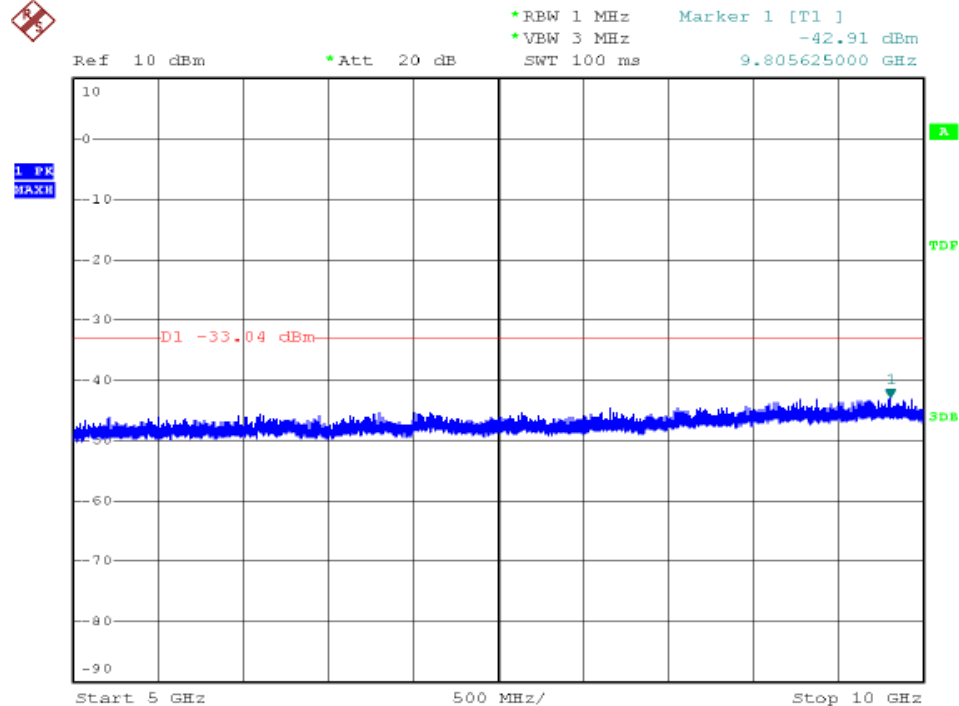
PLOT OF TEST DATA

2.4 GHz band (Audio transmitting)

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

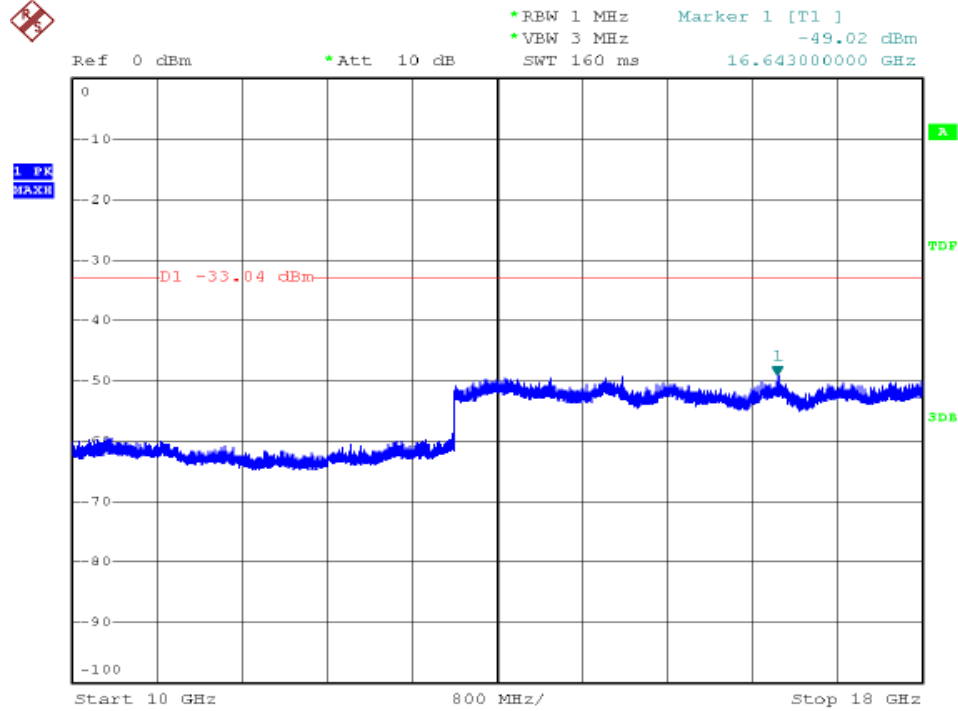


Conducted Spurious Emissions, 5 GHz ~ 10 GHz (2412 MHz, Audio transmitting)

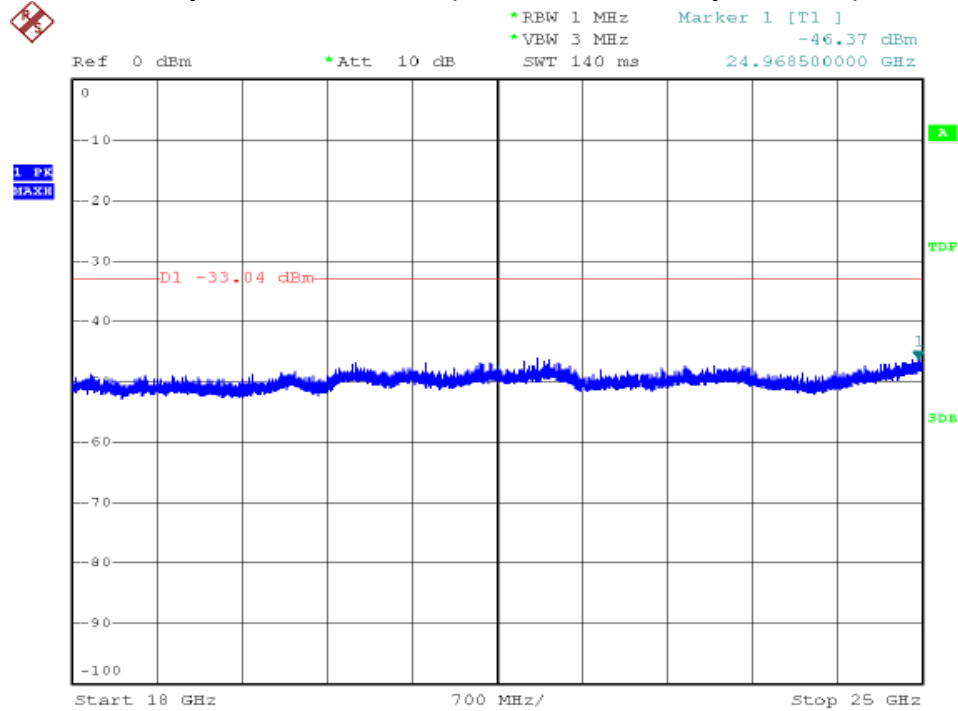


PLOT OF TEST DATA

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

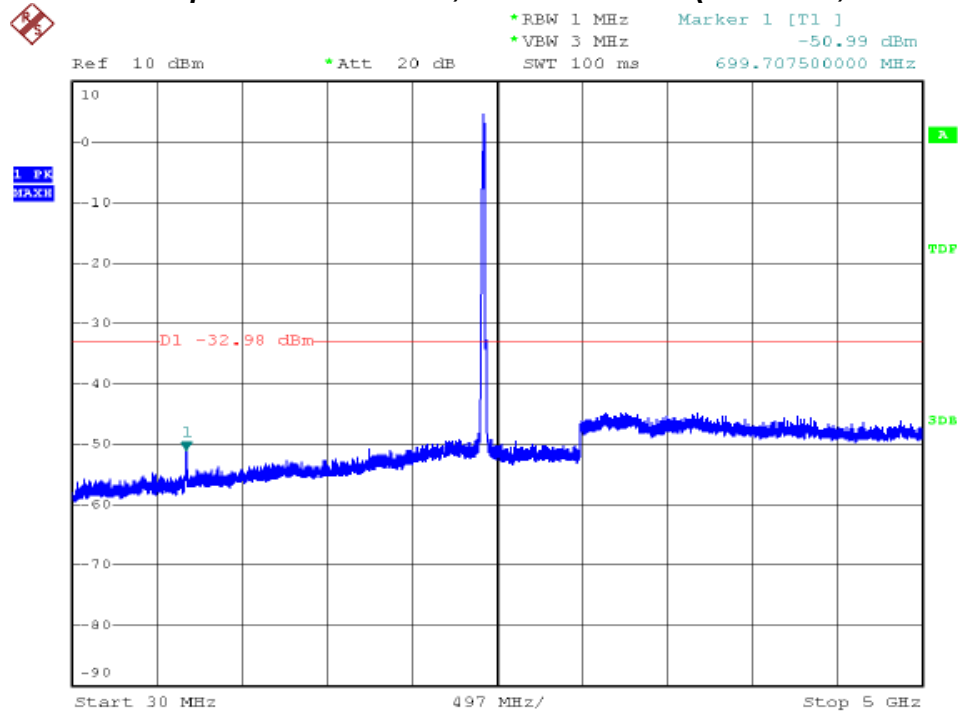


Conducted Spurious Emissions, 18 GHz ~ 25 GHz (2412 MHz, Audio transmitting)

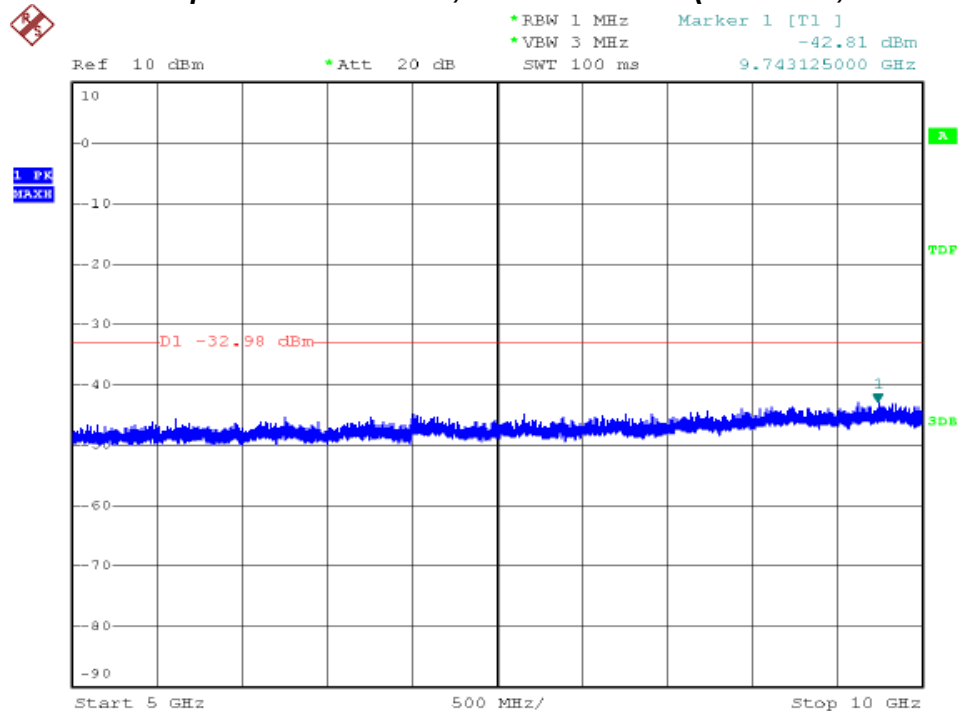


PLOT OF TEST DATA

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

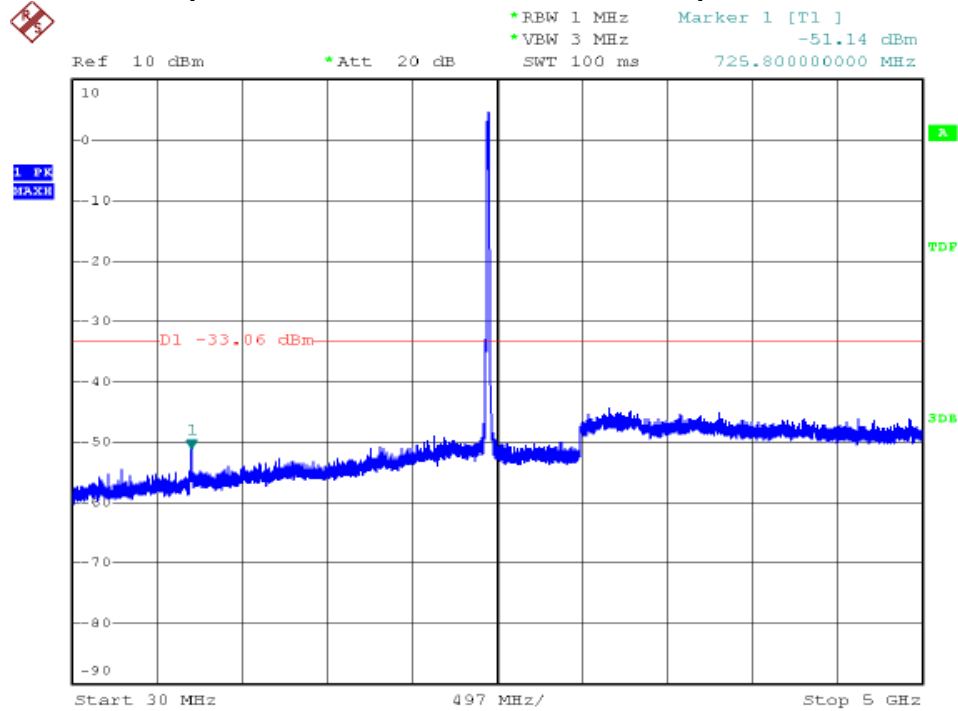


Conducted Spurious Emissions, 5 GHz ~ 10 GHz (2438 MHz, Audio transmitting)

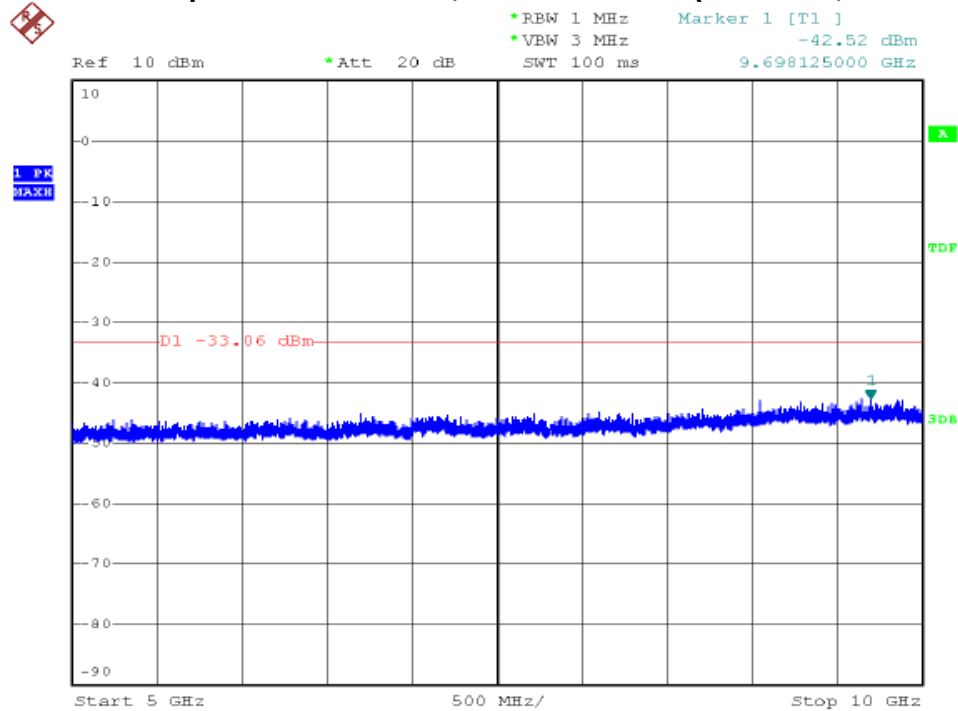


PLOT OF TEST DATA

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

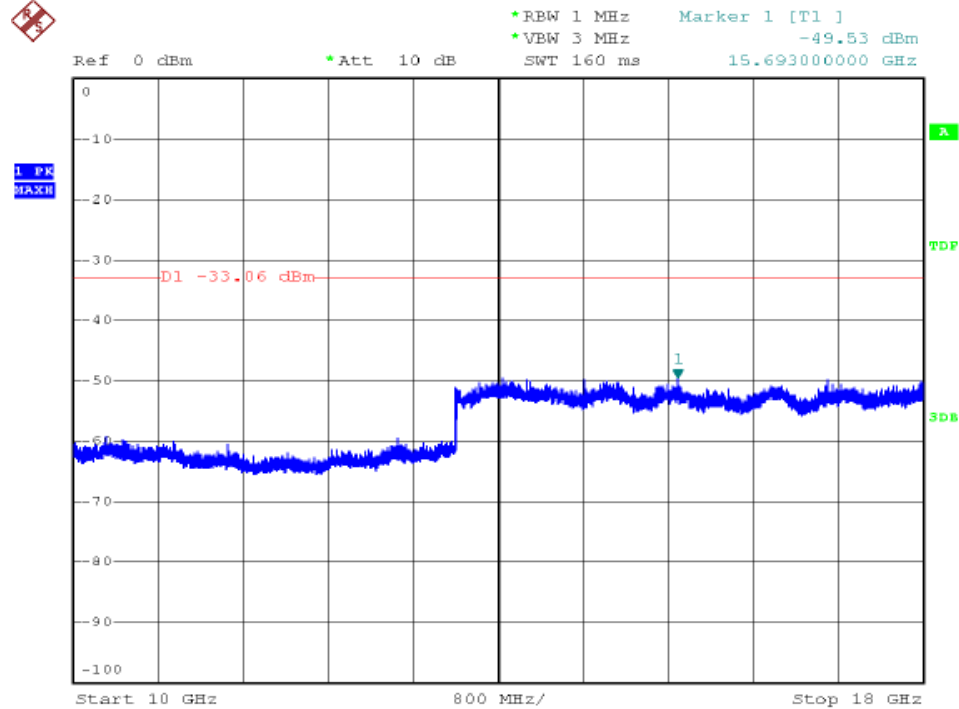


Conducted Spurious Emissions, 5 GHz ~ 10 GHz (2464 MHz, Audio transmitting)

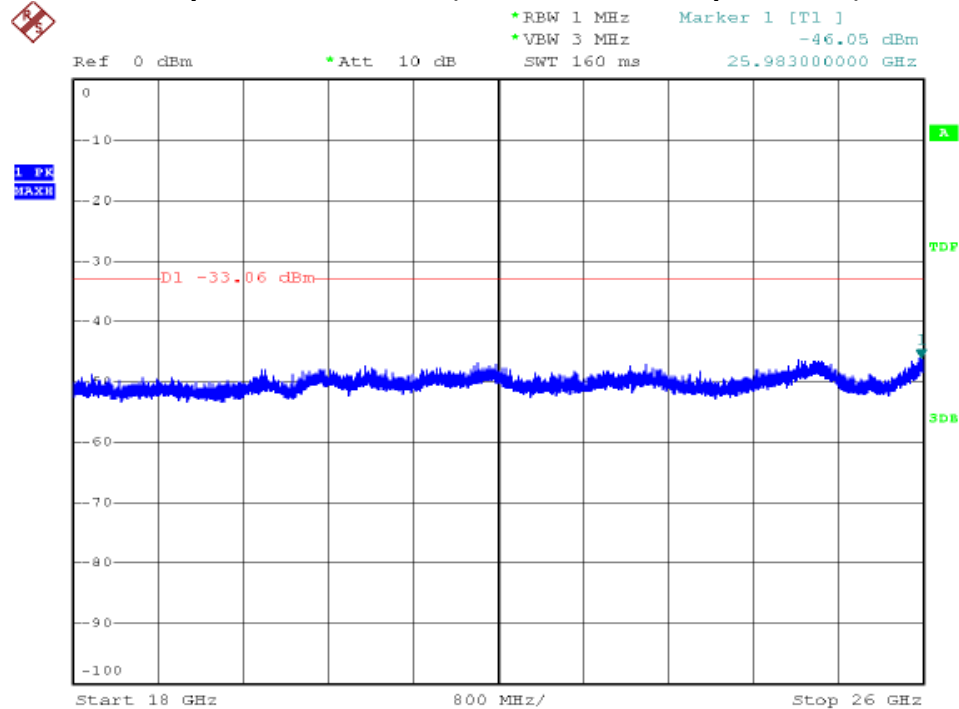


PLOT OF TEST DATA

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



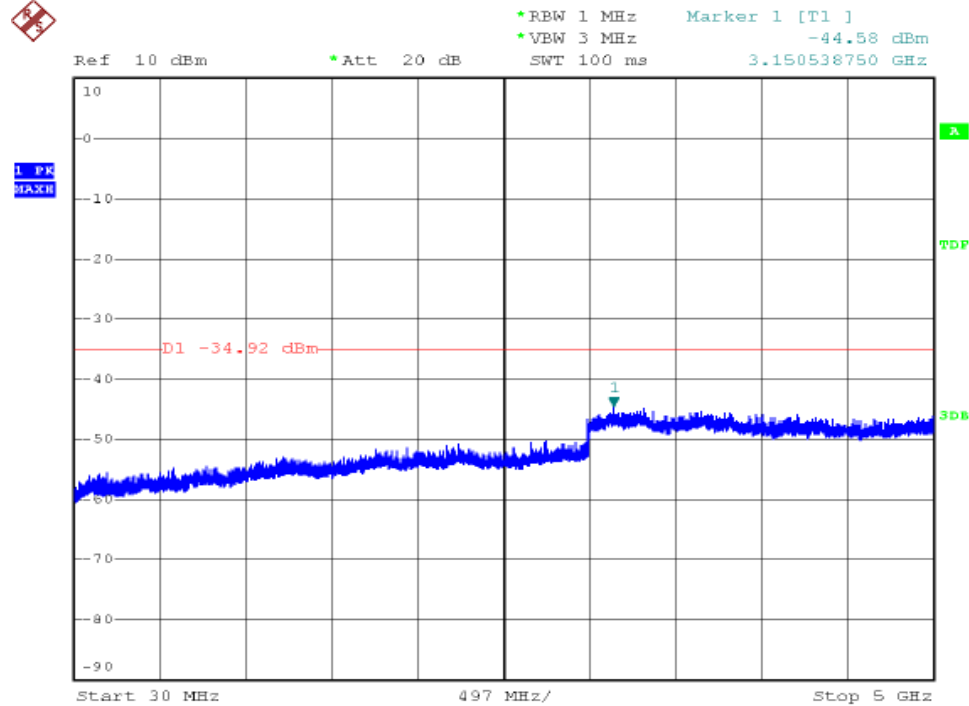
Conducted Spurious Emissions, 18 GHz ~ 25 GHz (2464 MHz, Audio transmitting)



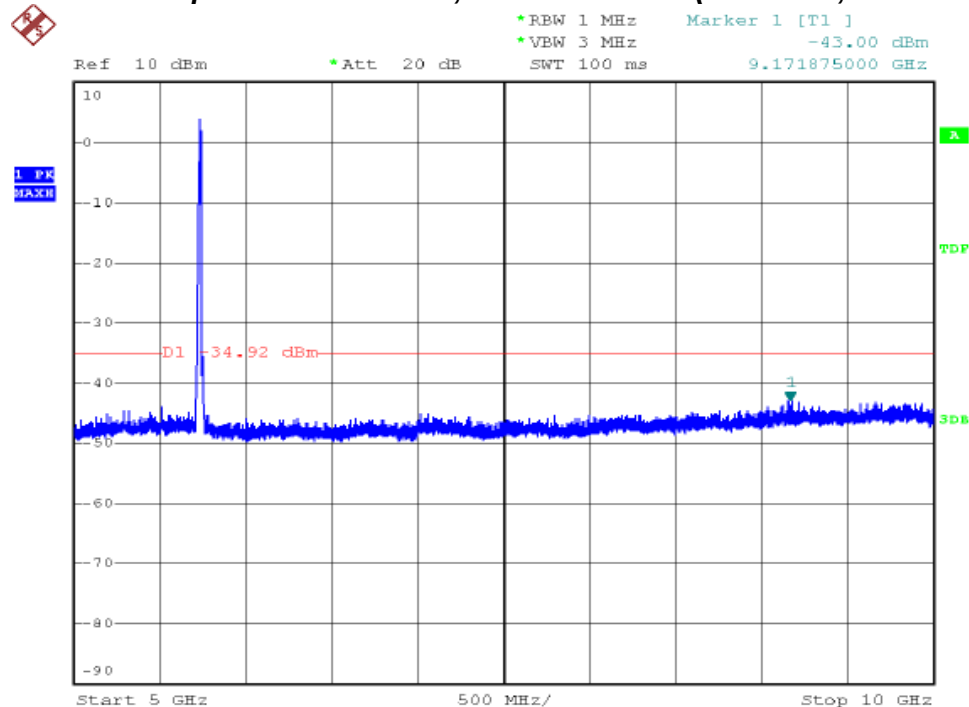
PLOT OF TEST DATA

5.8 GHz band (Audio transmitting)

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

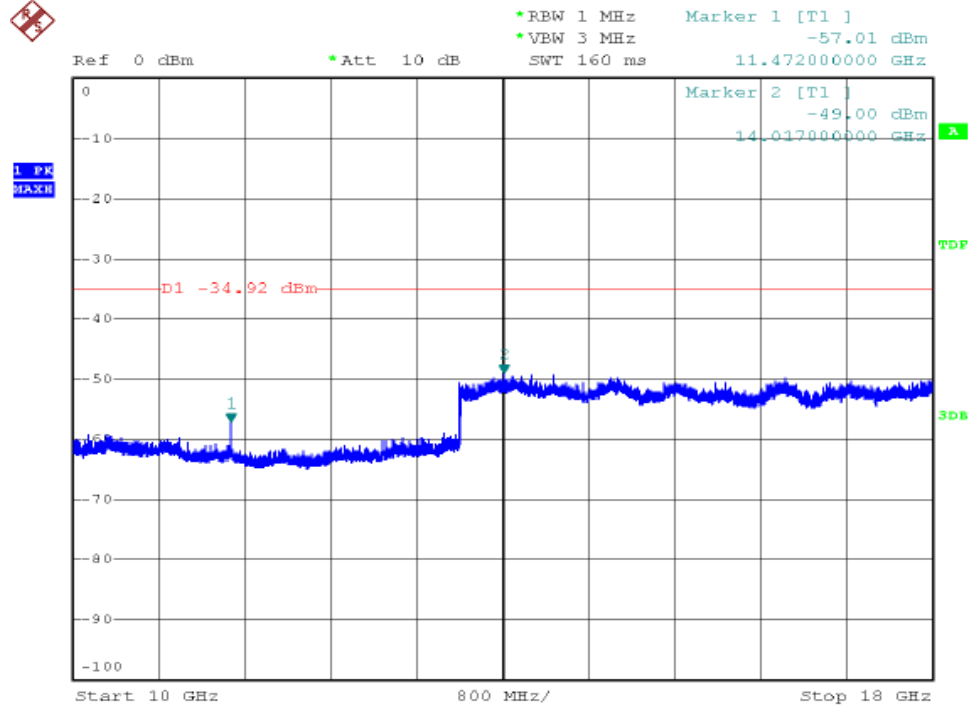


Conducted Spurious Emissions, 5 GHz ~ 10 GHz (5736 MHz, Audio transmitting)

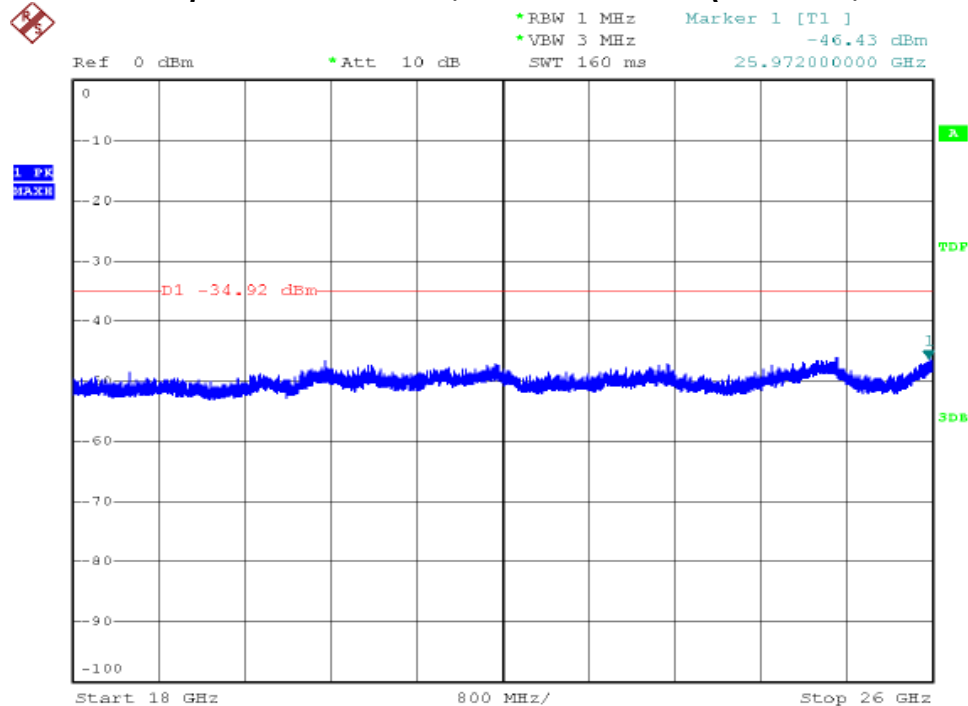


PLOT OF TEST DATA

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

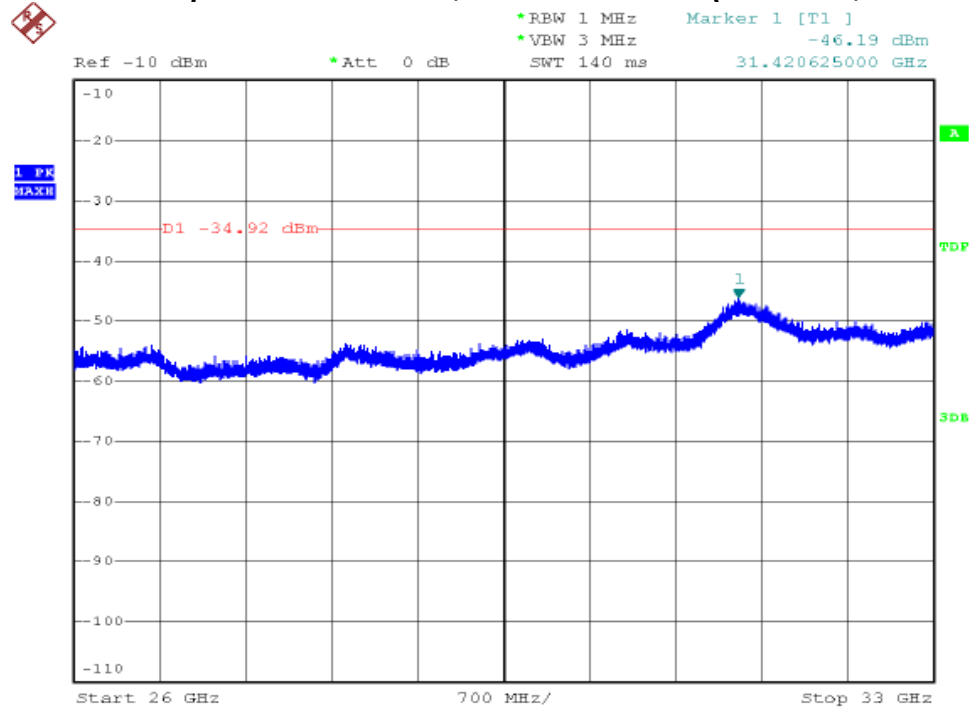


Conducted Spurious Emissions, 18 GHz ~ 26 GHz (5736 MHz, Audio transmitting)

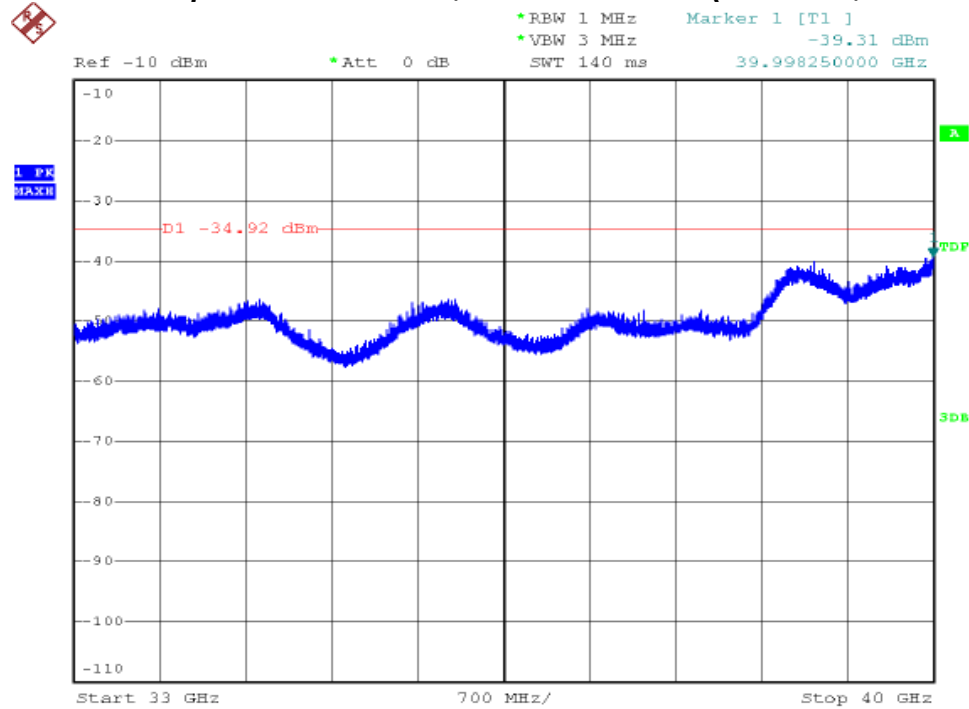


PLOT OF TEST DATA

Conducted Spurious Emissions, 26 GHz ~ 33 GHz (5736 MHz, Audio transmitting)

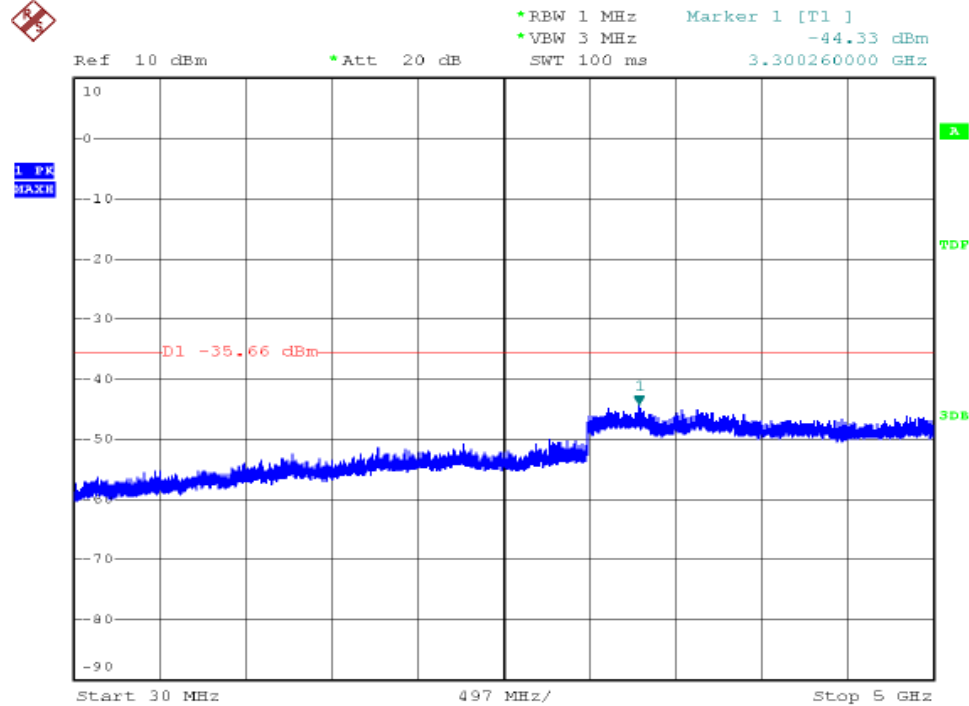


Conducted Spurious Emissions, 33 GHz ~ 40 GHz (5736 MHz, Audio transmitting)

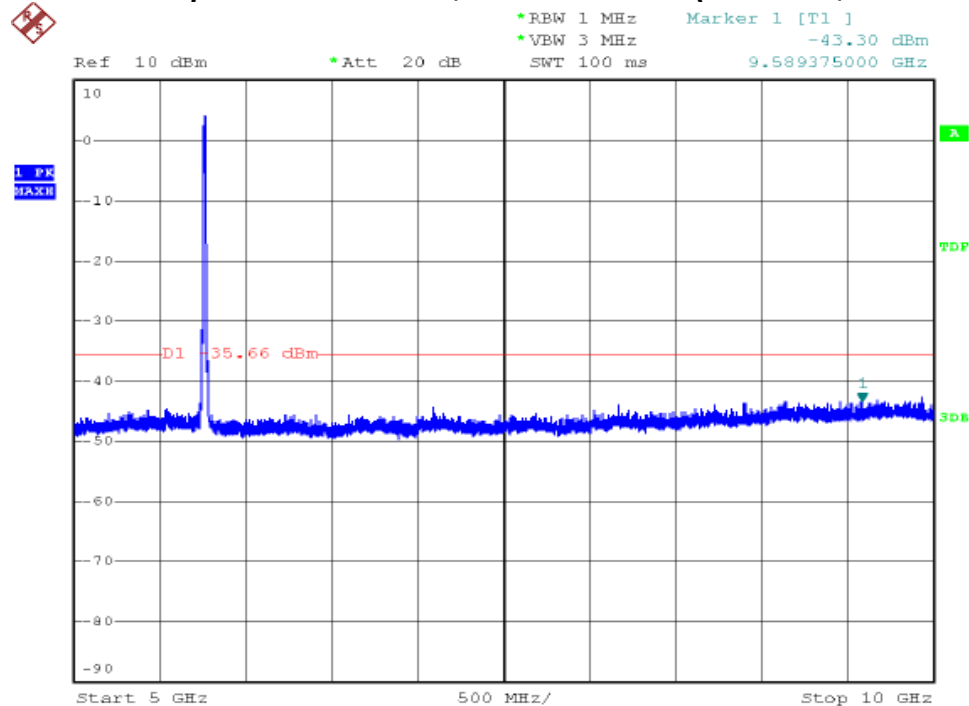


PLOT OF TEST DATA

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

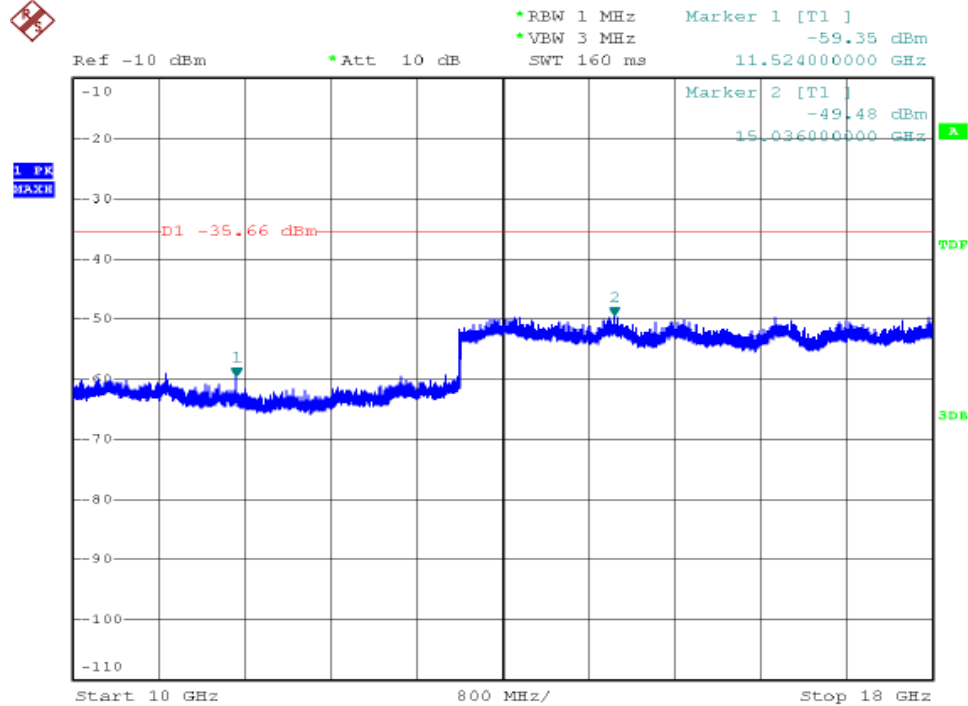


Conducted Spurious Emissions, 5 GHz ~ 10 GHz (5762 MHz, Audio transmitting)

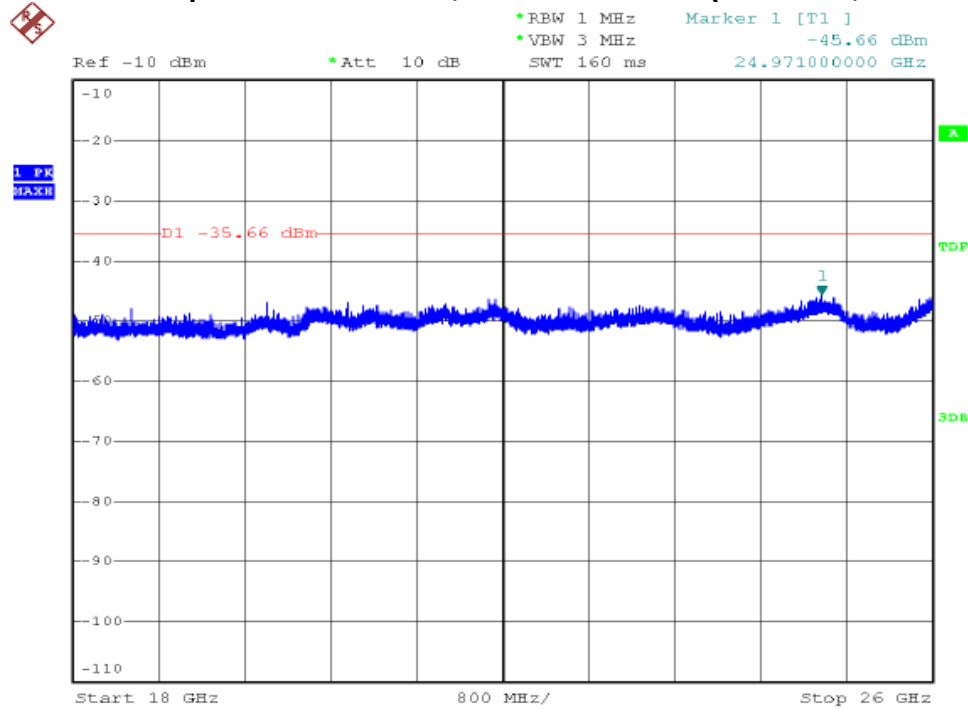


PLOT OF TEST DATA

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

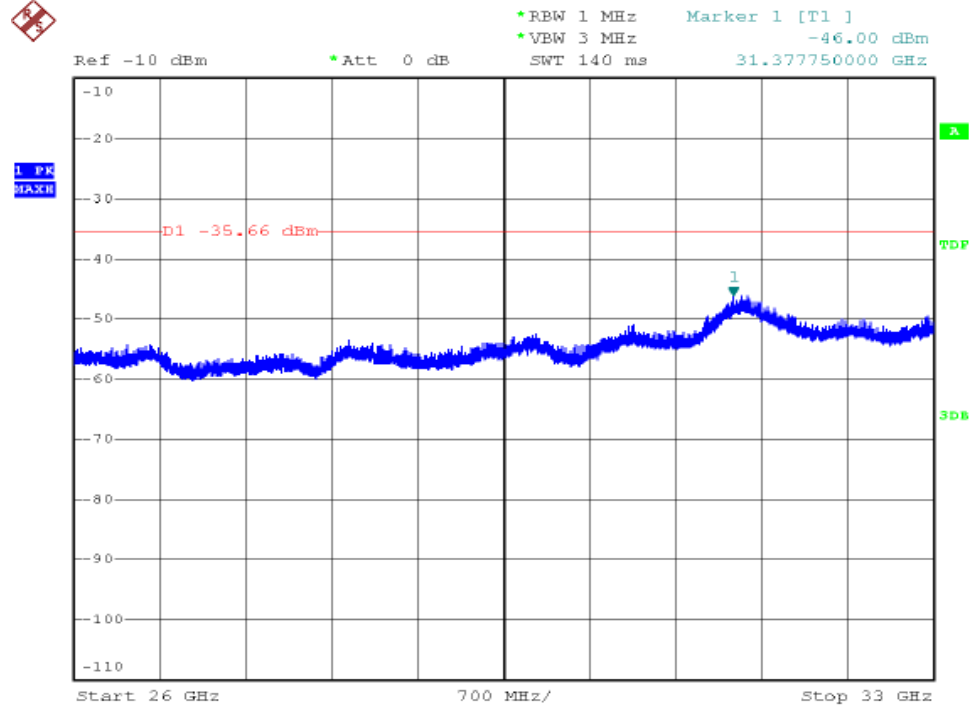


Conducted Spurious Emissions, 18 GHz ~ 26 GHz (5762 MHz, Audio transmitting)

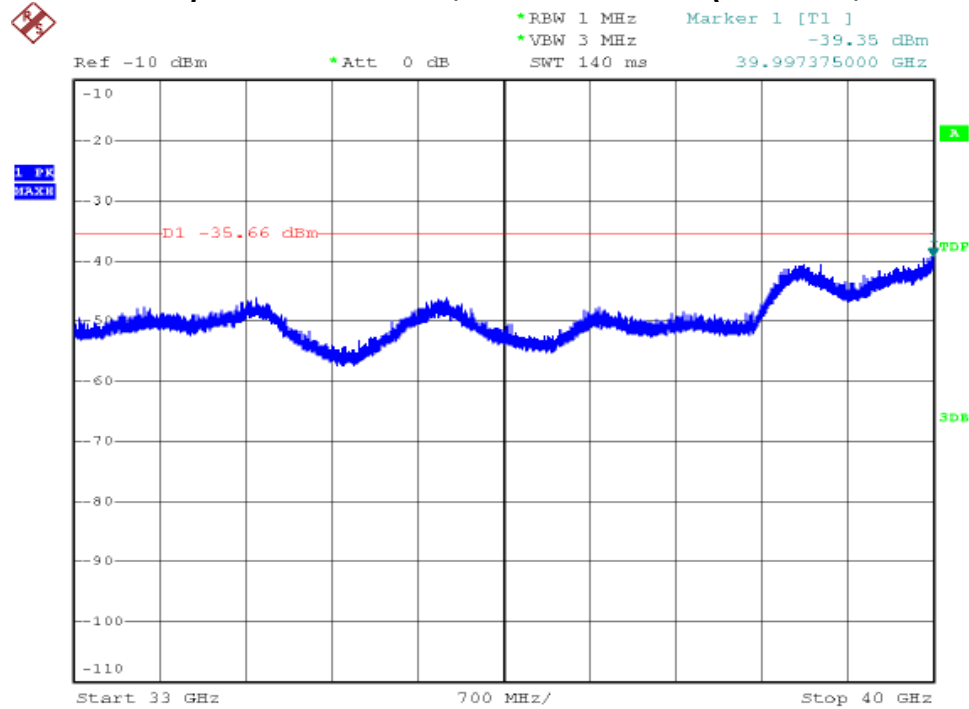


PLOT OF TEST DATA

Conducted Spurious Emissions, 26 GHz ~ 33 GHz (5762 MHz, Audio transmitting)

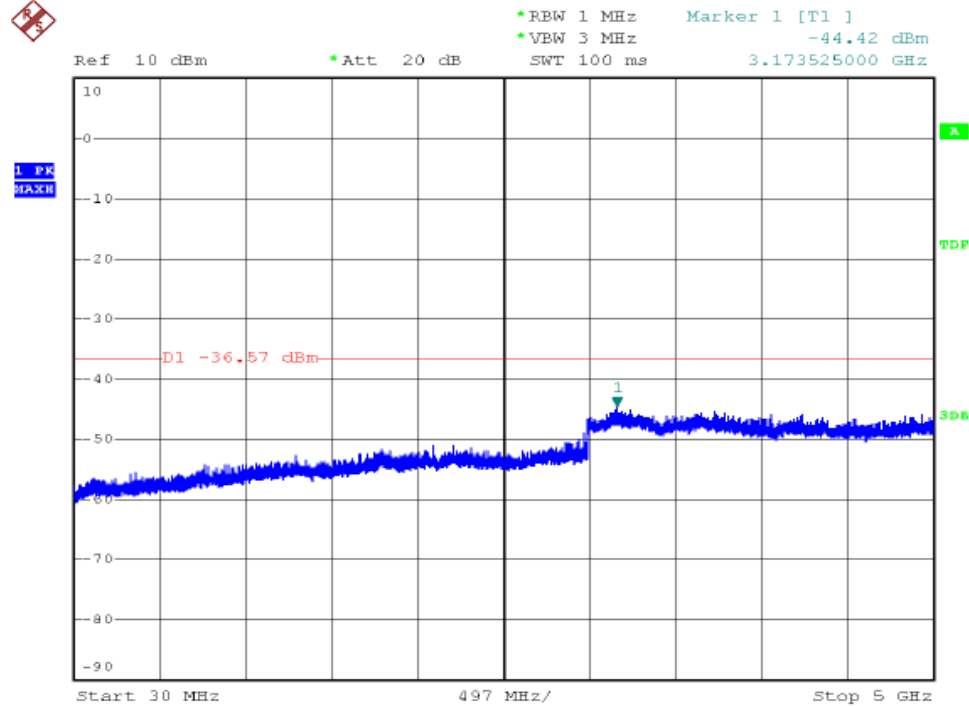


Conducted Spurious Emissions, 33 GHz ~ 40 GHz (5762 MHz, Audio transmitting)

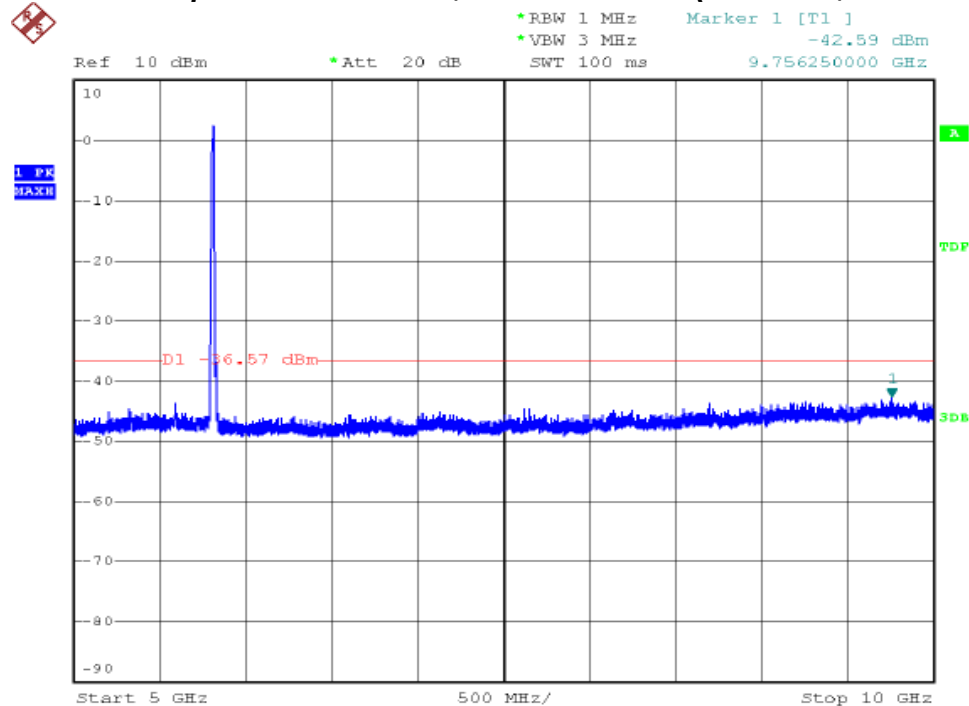


PLOT OF TEST DATA

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

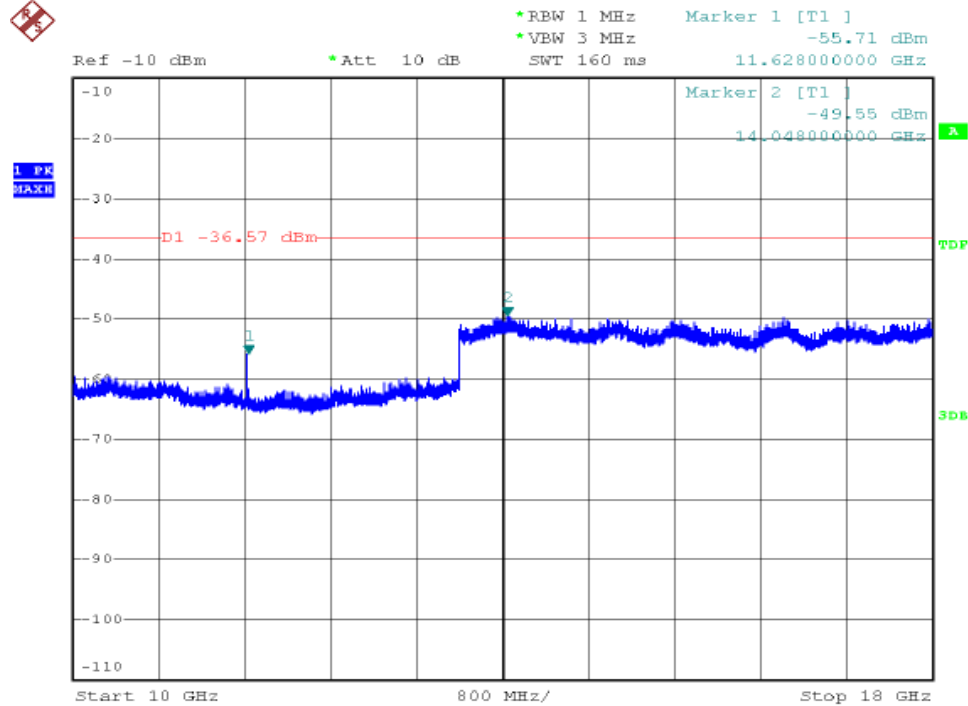


Conducted Spurious Emissions, 5 GHz ~ 10 GHz (5814 MHz, Audio transmitting)

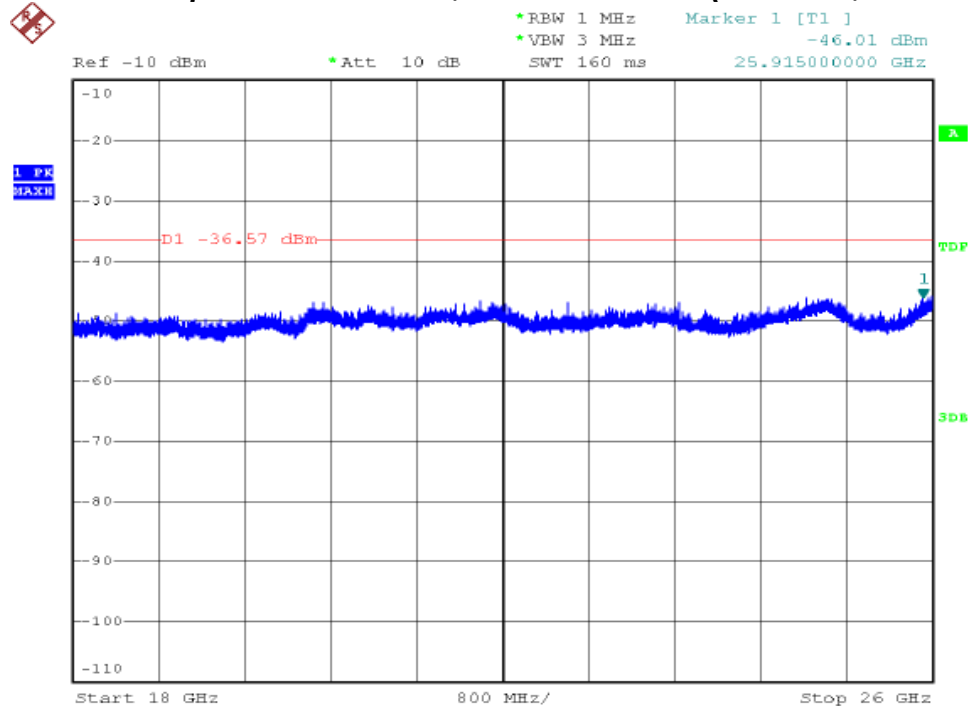


PLOT OF TEST DATA

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

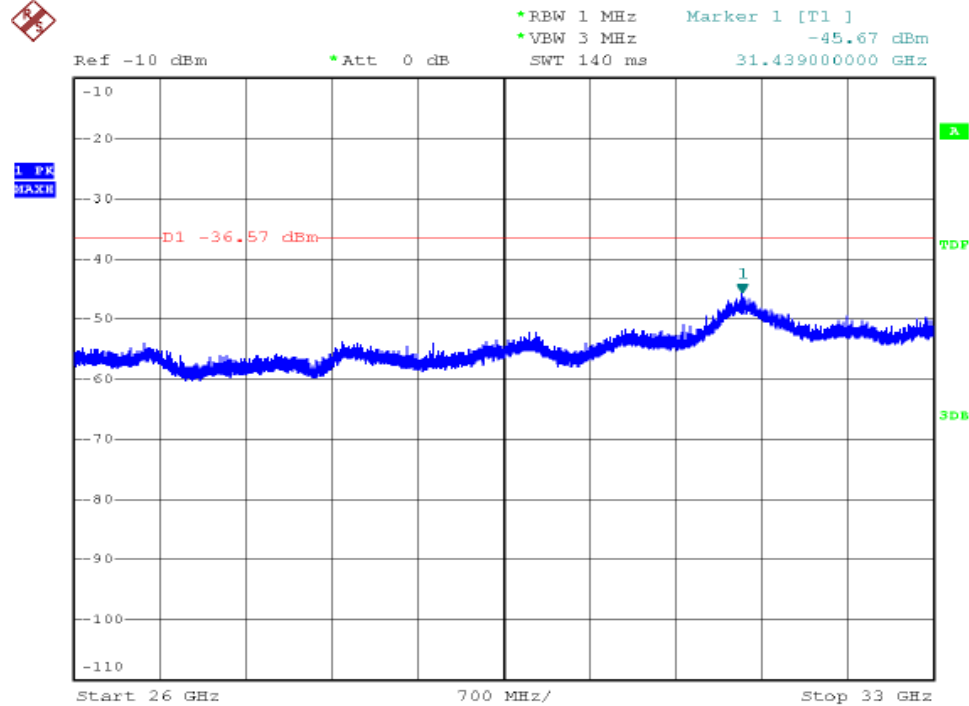


Conducted Spurious Emissions, 18 GHz ~ 26 GHz (5814 MHz, Audio transmitting)

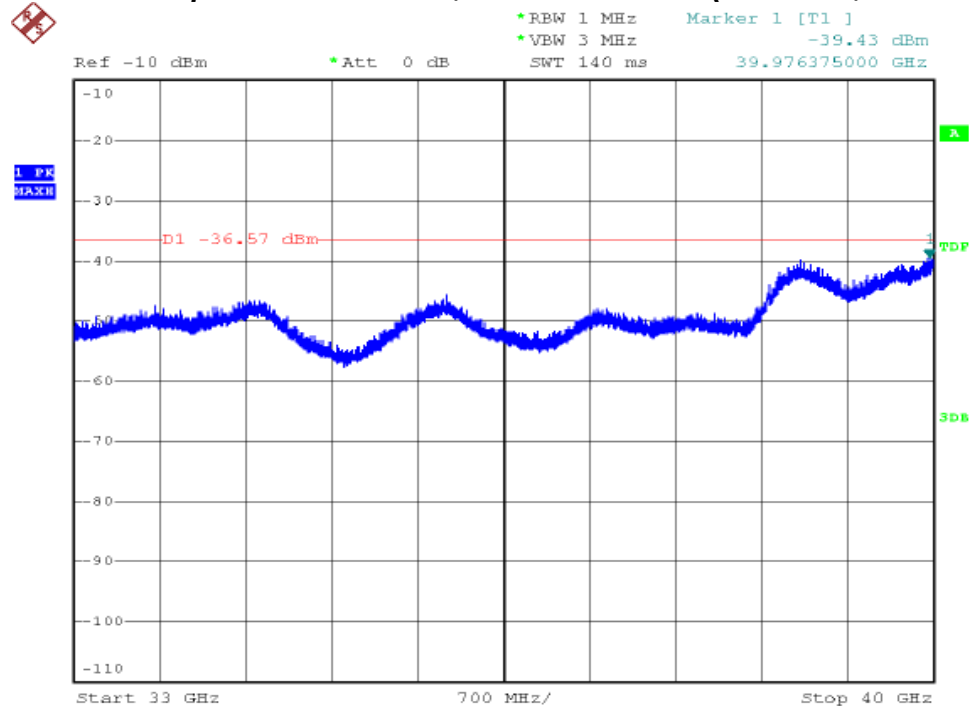


PLOT OF TEST DATA

Conducted Spurious Emissions, 26 GHz ~ 33 GHz (5814 MHz, Audio transmitting)



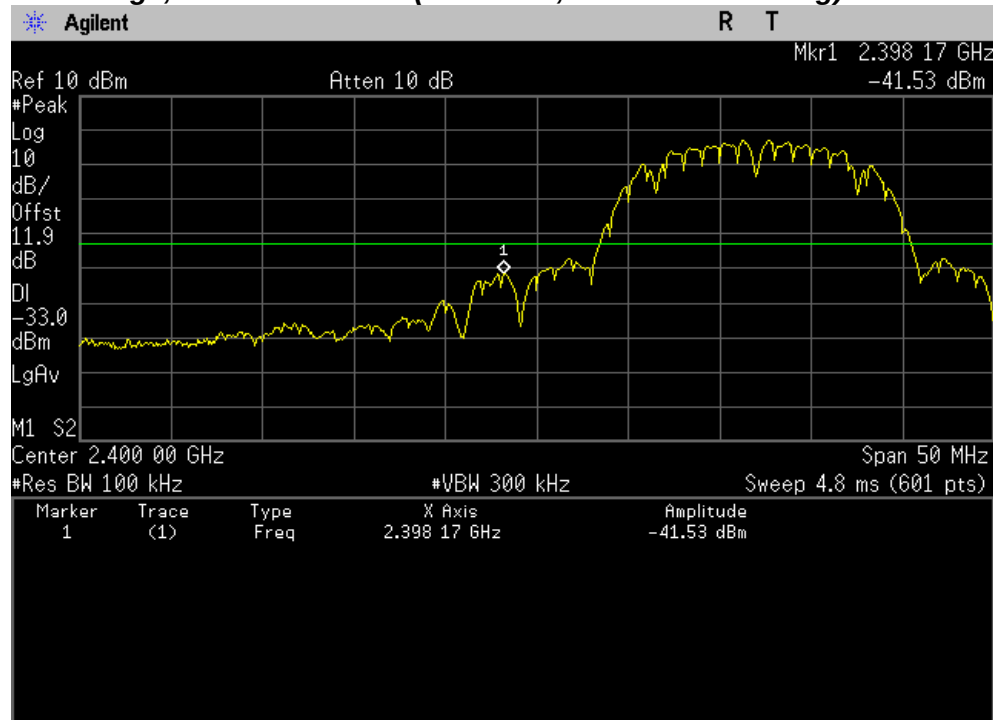
Conducted Spurious Emissions, 33 GHz ~ 40 GHz (5814 MHz, Audio transmitting)



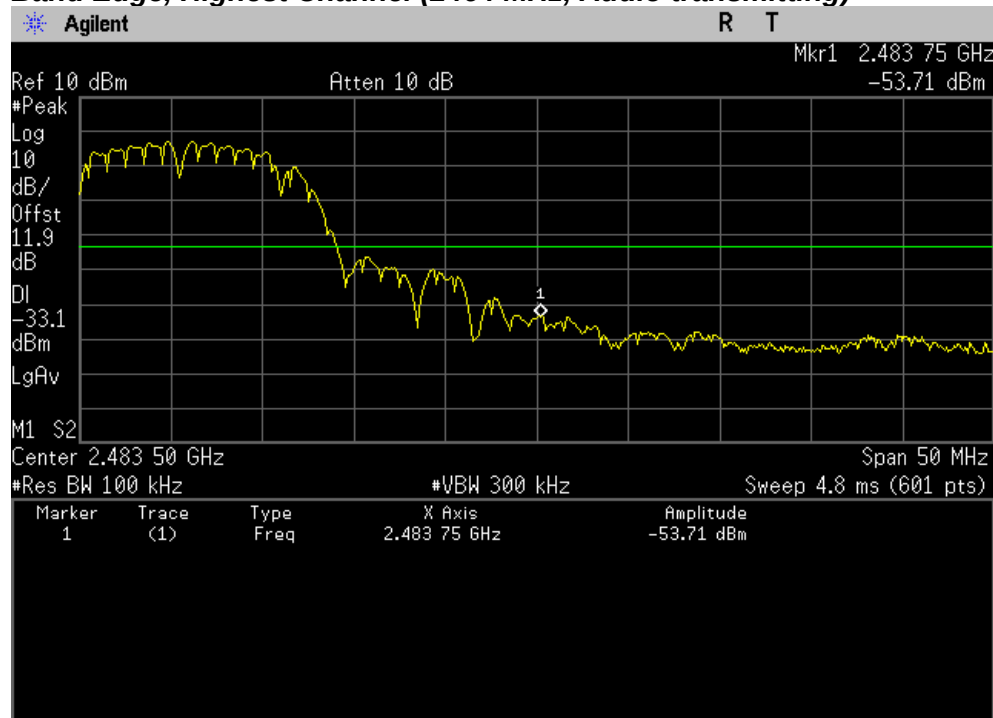
PLOT OF TEST DATA

2.4 GHz band (Audio transmitting)

Band Edge, Lowest Channel (2412 MHz, Audio transmitting)



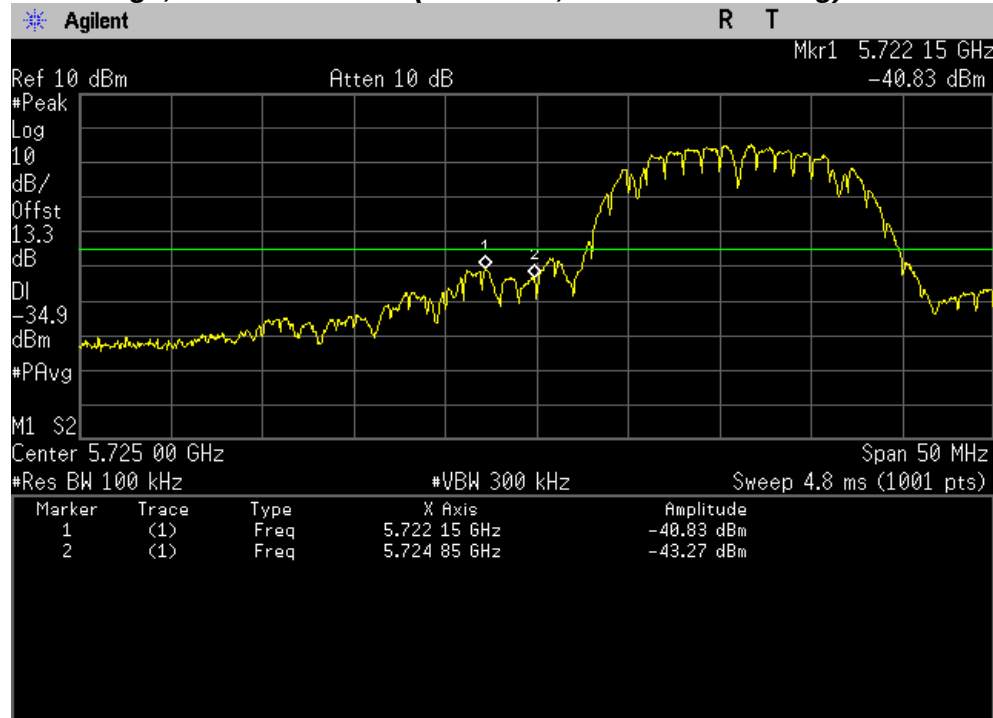
Band Edge, Highest Channel (2464 MHz, Audio transmitting)



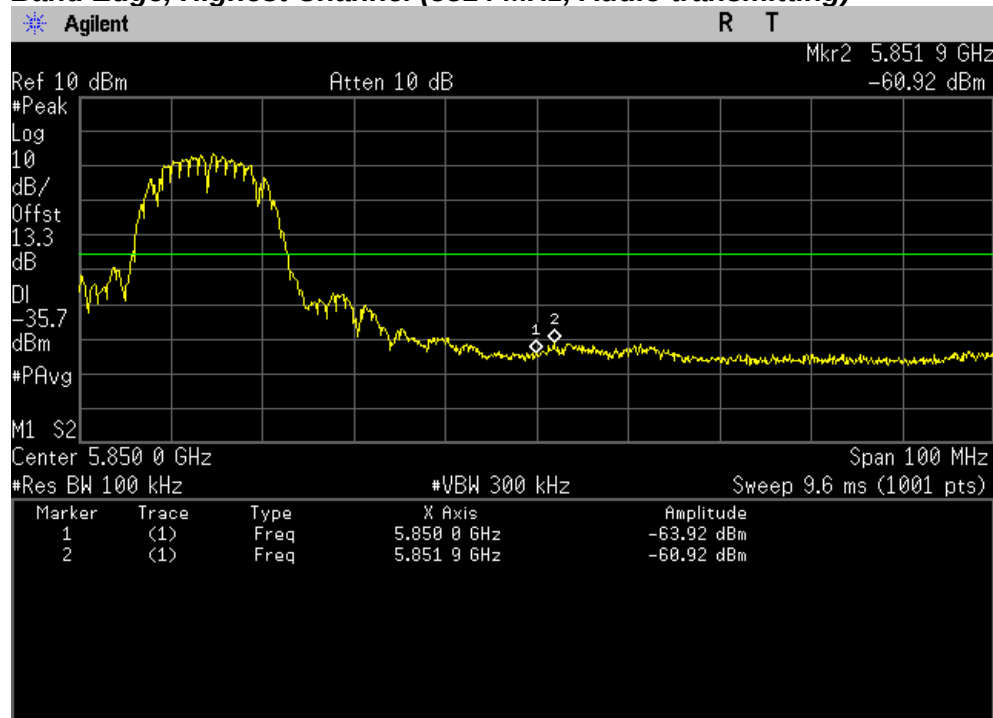
PLOT OF TEST DATA

5.8 GHz band (Audio transmitting)

Band Edge, Lowest Channel (5736 MHz, Audio transmitting)



Band Edge, Highest Channel (5814 MHz, Audio transmitting)



TEST DATA

8.6 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 band (Audio transmitting)

Lowest Channel (2412 MHz, Audio transmitting)

Frequency (GHz)	Reading (dBμV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
4824.00	40.50	H	peak	8.80	49.30	74.0	24.70
4824.00	33.10	H	average	8.80	41.90	54.0	12.10

Middle Channel (2438 MHz, Audio transmitting)

Frequency (GHz)	Reading (dBμV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
4876.13	41.40	V	peak	9.00	50.40	74.0	23.60
4876.13	35.30	V	average	9.00	44.30	54.0	9.70

Highest Channel (2464 MHz, Audio transmitting)

Frequency (GHz)	Reading (dBμV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
4928.25	41.00	V	peak	9.20	50.20	74.0	23.80
4928.25	34.80	V	average	9.20	44.00	54.0	10.00

5.8 GHz band (Audio transmitting)

Lowest Channel (5736 MHz, Audio transmitting)

Frequency (GHz)	Reading (dBμV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Distance (dB)***	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
11.472	49.17	H	peak	7.01	-6.02	50.16	74.0	23.84
11.472	45.21	H	average	7.01	-6.02	46.20	54.0	7.80
11.472	51.59	V	peak	7.01	-6.02	52.58	74.0	21.42
11.472	48.38	V	average	7.01	-6.02	49.37	54.0	4.63

Middle Channel (5762 MHz, Audio transmitting)

Frequency (GHz)	Reading (dBμV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Distance (dB)***	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
11.524	52.32	H	peak	7.03	-6.02	53.33	74.0	20.67
11.524	48.42	H	average	7.03	-6.02	49.43	54.0	4.57
11.524	52.23	V	peak	7.03	-6.02	53.24	74.0	20.76
11.524	48.80	V	average	7.03	-6.02	49.81	54.0	4.19

Highest Channel (5814 MHz, Audio transmitting)

Frequency (GHz)	Reading (dBμV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Distance (dB)***	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
11.628	51.44	H	peak	6.74	-6.02	52.16	74.0	21.84
11.628	48.75	H	average	6.74	-6.02	49.47	54.0	4.53
11.628	52.01	V	peak	6.74	-6.02	52.73	74.0	21.27
11.628	48.95	V	average	6.74	-6.02	49.67	54.0	4.33

Notes:

1. *Pol. H = Horizontal V = Vertical
2. **AF + CL + Amp. = Antenna Factor + Cable Loss + Amplifier.
3. ***Distance factor = $20 \log (\text{test distance} / \text{specific distance}) = 20 \log (1.5 / 3)$
4. Other spurious are under 30 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 2nd harmonic for this device.

TEST DATA

8.7 Radiated Band Edge

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

Test Mode : Set to Lowest channel and Highest channel

Lowest channel

Frequency (MHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
2389.64	49.50	V	peak	-1.00	48.50	74.0	25.50
2389.84	40.80	V	average	-1.00	39.80	54.0	14.20

Highest channel

Frequency (MHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
2483.58	51.20	V	peak	-0.50	50.70	74.0	23.30
2483.56	45.00	V	average	-0.50	44.50	54.0	9.50

Notes:

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

*) Test equipment used during the test

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	X_i	Uncertainty of X_i		Coverage factor k	$u(X_i)$ (dB)	C_i	$C_i u(X_i)$ (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	X_i	Uncertainty of X_i		Coverage factor k	$u(X_i)$ (dB)	C_i	$C_i u(X_i)$ (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 : + ($\geq$ 200 MHz) Ⓓ: Log Periodic Antenna-receiver Mismatch : - ($\geq$ 200 MHz)						
Combined Standard Uncertainty	Normal			± 2.63 (< 200 MHz) ± 2.74 ($\geq$ 200 MHz)			
Expanded Uncertainty U	Normal ($k = 2$)			± 5.26 (< 200 MHz) ± 5.48 ($\geq$ 200 MHz)			