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Prüfbericht - Nr.: *Test Report No.:*	**19660242 001**	**Seite 1 von 29** *Page 1 of 29*
Auftraggeber: *Client:*	**HANDHELD GROUP AB** **Kinnegatan 17 A** **531 33 Lidköping** **Sweden** **Tel: +46 (0) 510-54 71 70**	
Gegenstand der Prüfung: *Test item:*	**Rugged 7" Tablet**	
Bezeichnung: *Identification:*	**118207**	**Serien-Nr.:** *Serial No.* **Engineering Sample**
Wareneingangs-Nr.: *Receipt No.:*	**1803156247**	**Eingangsdatum:** *Date of receipt:* **20.07.2016**
Prüfort: *Testing location:*	**Refer Page 4 of 29 for test facilities**	
Prüfgrundlage: *Test specification:*	**FCC Part 15: Subpart C & RSS 247 Issue 1** **ANSI C63.10-2013**	
Prüfergebnis: *Test Result:*	**Der Prüfgegenstand entspricht oben genannter Prüfgrundlage(n).** *The test items passed the test specification(s).*	
Prüflaboratorium: *Testing Laboratory:*	**TÜV Rheinland (India) Pvt. Ltd.** 82/A, 3rd Main, West Wing, Electronic City Phase 1 Hosur Road, Bangalore – 560 100. India **FCC Registration No.: 176555 & IC OATS Reg. Number.: 3466E**	

geprüft / *tested by:*			**kontrolliert** / *reviewed by:*		
11.08.2016	Shrikanth S Naik Sr.Engineer		15.08.2016	Saibaba Siddapur Assistant Manager	
Datum *Date*	**Name/Stellung** *Name/Position*	**Unterschrift** *Signature*	**Datum** *Date*	**Name/Stellung** *Name/Position*	**Unterschrift** *Signature*

Sonstiges /*Other Aspects:* **FCC ID: YY3-118207 & IC: 11695A-118207**

Abkürzungen:				***Abbreviations:***			
	P(ass)	=	***entspricht Prüfgrundlage***		***P(ass)***	=	***passed***
	F(ail)	=	***entspricht nicht Prüfgrundlage***		***F(ail)***	=	***failed***
	N/A	=	***nicht anwendbar***		***N/A***	=	***not applicable***
	N/T	=	***nicht getestet***		***N/T***	=	***not tested***

Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens.

This test report relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any safety mark on this or similar products.

Test Result Summary

Test Item	Clause		Result
	FCC	IC	
Maximum Peak Conducted Output Power	FCC 15.247(b) (3)	RSS 247 Issue 1, Section 5.4 (4)	Pass
DTS Bandwidth	FCC 15.247(a) (2)	RSS 247 Issue 1, Section 5.2 (1)	Pass
Maximum Power Spectral Density	FCC 15.247(e)	RSS 247 Issue 1, Section 5.2 (2)	Pass
Emissions in non-restricted frequency bands	FCC 15.247(d)	RSS 247 Issue 1, Section 5.5	Pass
Spurious Radiated Emissions and Restricted Bands of Operation	FCC 15.209 / FCC 15.205	RSS-Gen Issue 4,Section 8.9/8.10	Pass
Conducted Emissions on A.C Power Lines	FCC Part 15.207	RSS-Gen Issue 4 section 8.8	Pass

Note: Conducted measurements are done according to the procedure given in KDB No. **558074 D01 DTS Meas Guidance v03r05**

Content

List of Test and Measurement Instruments

Equipment	Manufacturer	Model Name	Serial Number	Calibration Due Date	Periodicity	Used for Test Items
EMI Test Receiver	Rohde & Schwarz	ESU 40	100288	23.11.2016	Yearly	Spurious Radiated Emissions
Broadband Antenna	Frankonia	ALX-4000	ALX-4000-806	20.01.2017	Yearly	
Active Loop Antenna	Frankonia	LAX-10	LAX-10-800	22.12.2016	Yearly	
Broadband Horn Antenna	Frankonia	HAX-18	HAX18-802	14.03.2017	Yearly	
Double-Ridged Waveguide Horn Antenna	ETS Lindgren	116706	00107323	02.11.2016	Yearly	
Anechoic Chamber	Frankonia	-	-		-	
Spectrum Analyser	Agilent Technologies	E4407B	US41192772	23.04.2017	Yearly	Antenna - Port Conducted Tests
Signal Analyzer	Rohde & Schwarz	FSV7	101644	07.12.2016	Yearly	
LISN	Rohde & Schwarz	ENV4200	100163	03.02.2017	Yearly	Conducted Emission test on AC power lines
EMI Receiver	Rohde & Schwarz	ESR7	101133	19.11.2016	Yearly	

Testing Facilities

TUV Rheinland (India) Private Limited
108 , Beside ISBR Business School,
Electronic city Phase I
Bangalore - 560 100.

General Product Information

Product Function and Intended Use

The Algiz RT7 is a rugged tablet, designed for use by field personnel in demanding conditions. It integrates best-in-class connectivity with efficient computing and multimedia features. The tablet runs Android Lollipop (5.1.1) operating system, and comes pre-installed with many Google applications, including Google Play.

Ratings and System Details

Operating Frequency Range	2400MHz – 2483.50MHz
No. of channel	40
Channel Spacing	2MHz
Modulation	GFSK
Transmitted Power	**-0.39dBm / 0.9141mW**
Number of antenna	One
Antenna Gain	0dBi
Antenna Type	Integrated Antenna
Supply Voltage to Module	Internal Battery Pack -> 3.7- 4.2 VDC & Adaptor 5VDC to EUT
Environmental conditions	Storage Temperature -> -40ºC to +70 ºC Operating Temperature-> -20ºC to 50ºC in a humidity up to 95% noncondensing

Test Conditions:

Supply Voltage: 3.7- 4.2 VDC & Adaptor 5VDC to EUT

Environmental conditions:

Temperature: +24.6 º C RH: 56%

Test Set-up and Operation Mode

Principle of Configuration Selection

Transmission was enabled with duty cycle more than 98% on low, mid and high channel.

Test Operation and Test Software

QRCT test software (from QUALCOMM) was used to enable continuous transmission with duty cycle more than 98%, changing channels (low/mid/high) and select data rates on the EUT for the tests in this report.

Special Accessories and Auxiliary Equipment

- None

Countermeasures to achieve EMC Compliance

-Testing was conducted with the Power adaptor (Adaptor image attached in external photos) cable connected to the AC mains & a ferrite bead was used on the USB cable which is connected to the adaptor (accessory). The ferrite was strapped closer to the DUT during testing. Refer appendix 1 for test setup photos. Ferrite no. 742 711 12 & 742 717 33 (make: Wurth Electronics).

Test Modes – Data Rates and Modulations

For Radiated spurious emissions, the tests were performed for low, mid, high channel and only worst case results are reported in this report.

List of Centre Frequencies

Frequency Band (MHz)	Channel No.	Channel Frequency (MHz)
2400 – 2483.5	0	**2402**
	1	2404
	2	2406
	3	2408
	:	:
	:	:
	18	2438
	19	**2440**
	20	2437
	:	:
	:	:
	36	2474
	37	2476
	38	2478
	39	**2480**

Operational description

Whether you're collecting data, crunching numbers or viewing graphics, the Algiz RT7's powerful Qualcomm quad-core processor provides reliable, uninterrupted work performance.

And the Algiz RT7 doesn't just run Android flawlessly — its capacitive touchscreen also enhances the Android experience with five-point multi-touch capability, 600-nit high-brightness sunlight readability and chemically strengthened glass.

Yet the Algiz RT7 also meets stringent MIL-STD-810G military standards for withstanding extreme temperatures, drops and vibrations, and its IP65 rating means it's waterproof and fully protected against sand and dust.

Note: Product Rugged 7" Tablet has multiple protocols. All the supported wireless protocols and their respective test report numbers are mentioned in the below table.

Radio Protocol	Report Number
NFC	19660243 001
Wi-Fi (IEEE 802.11bgn)	19660240 001
Bluetooth (BDR+EDR)	19660241 001
GSM	19660244 001
W-CDMA	19660245 001
LTE	19660246 001

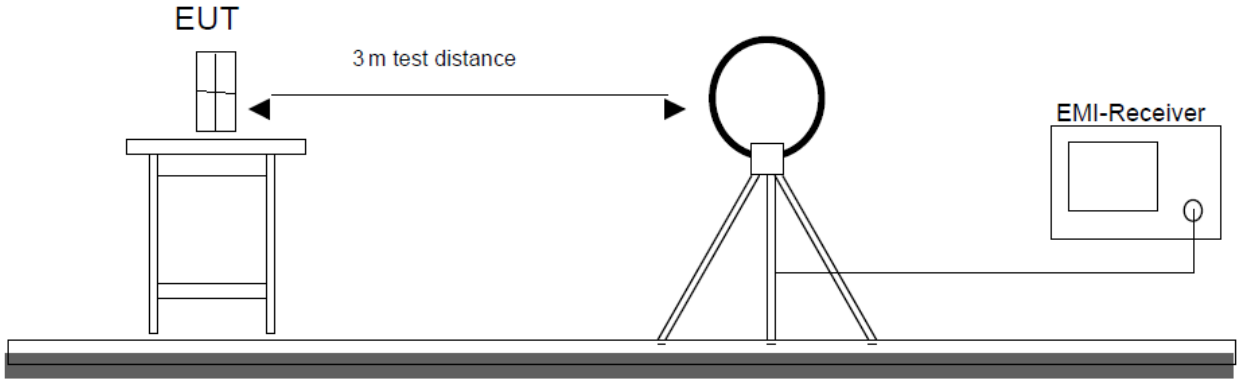
Test Methodology

Radiated Emission Test

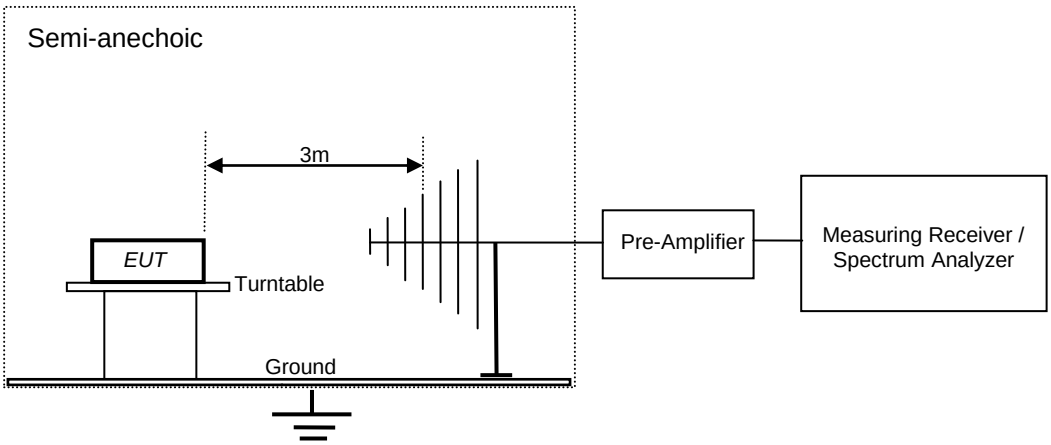
The radiated emission measurement was performed according to the procedures in ANSI C63.10-2013. The equipment under test (EUT) was placed at the middle of the 80 cm high turntable for below 1GHz & 1.5m height for above 1GHz measurement, and the EUT is 3 meters far from the measuring antenna. The turntable was rotated 360° for obtaining the maximum emission. The height of the measuring antennas was scanned between 1m and 4m, and the antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations. Repeat the measurement steps until the maximum emissions were obtained. The measurement above 1000MHz was performed by horn antenna. The measurement below 30MHz was performed by loop antenna.
The EUT was rotated around the X-, Y-, and Z-Axis and the results from worst case axis are recorded.

Test Setup Configuration

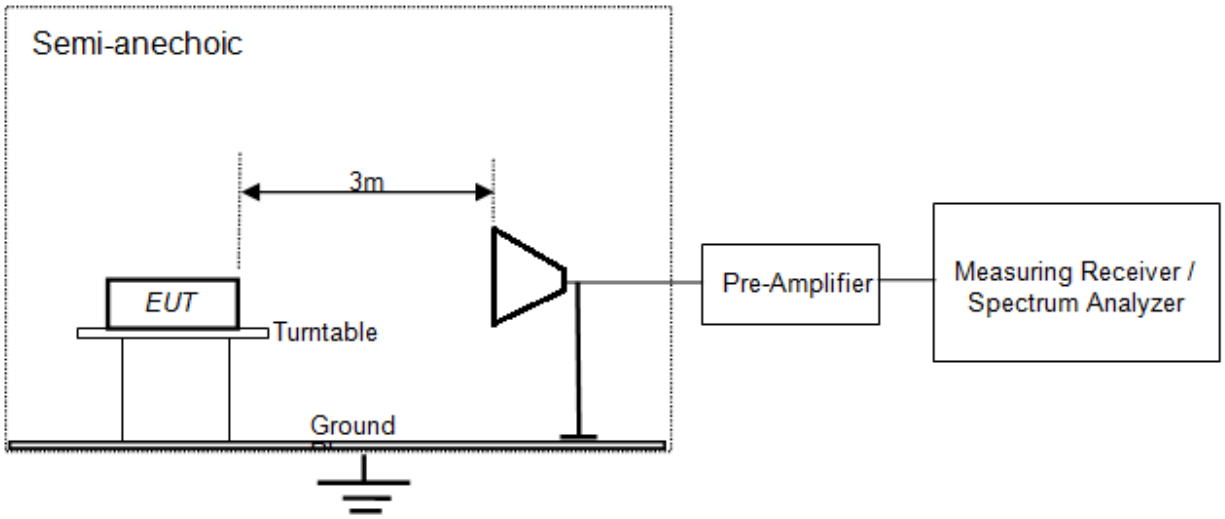
Frequency Range 9 kHz -30 MHz



Frequency Range 30MHz -1GHz

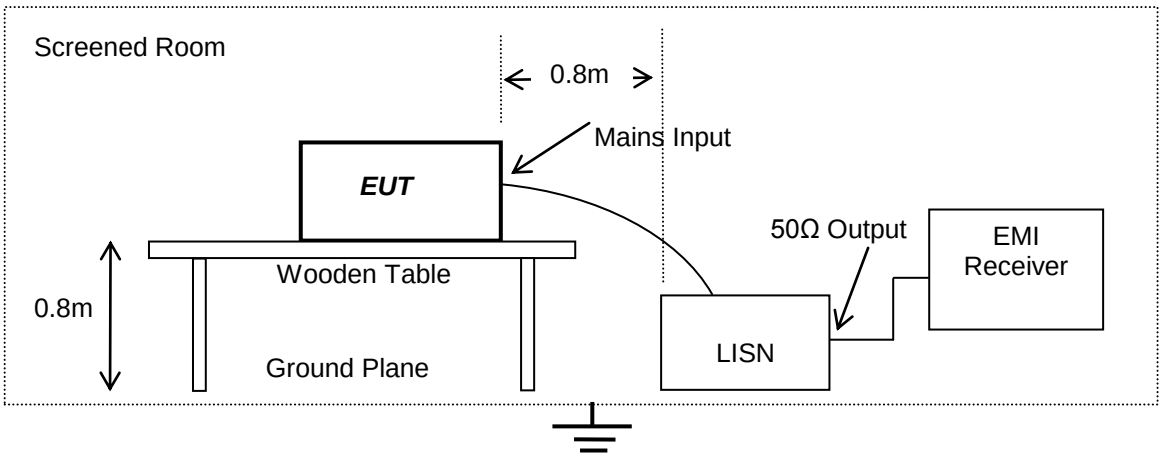


Frequency above 1GHz



Conducted Emission Test on A.C. mains line

The equipment under test (EUT) was placed on a wooden table 80cm above the ground plane, the LISN was place 80cm away from the EUT. The test was performed in accordance with ANSI C63.10 - 2013, with the following: an initial measurement was performed in peak and average detection mode on the live and neutral lines. The pre-scan was performed by peak detection on both live and neutral conductors. Any emissions recorded within 20dB of the relevant limit line were re-measured using quasi-peak and average detections, the 6 worst cases was recorded in the table of results.

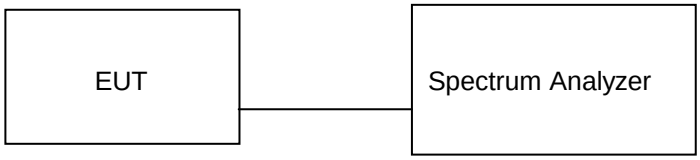


Test Results

Maximum Peak Conducted Output Power
Result **Pass**

Test Specification	FCC Part 15.247(b) (3) & RSS 247 Issue 1, Section 5.4 (4)
Measurement Bandwidth (RBW)	1MHz
Requirement	≤1 watt (30dBm).

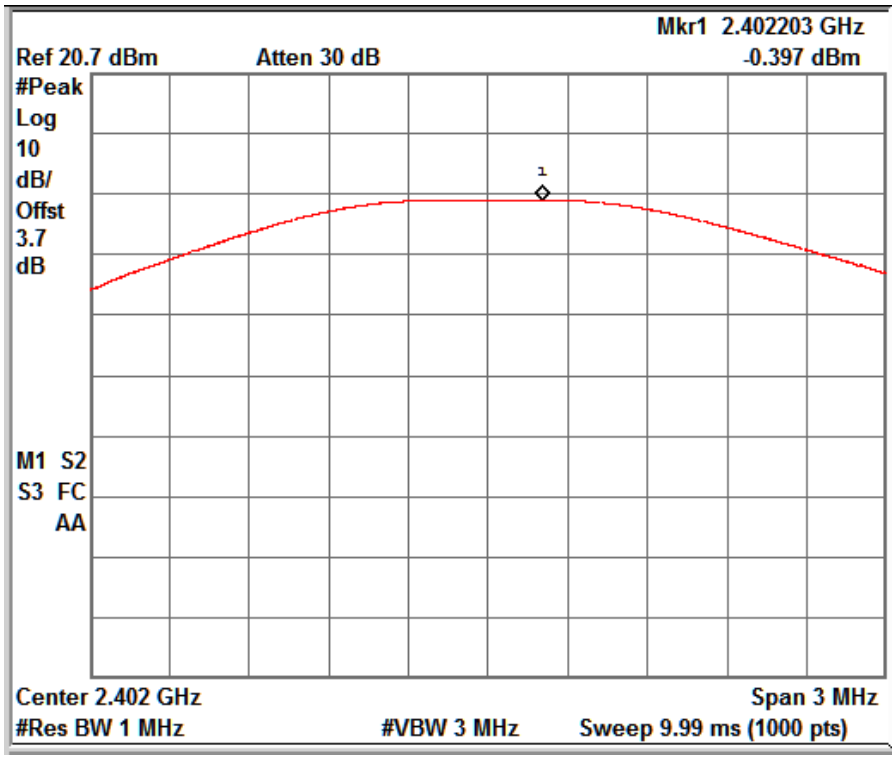
Test Method:



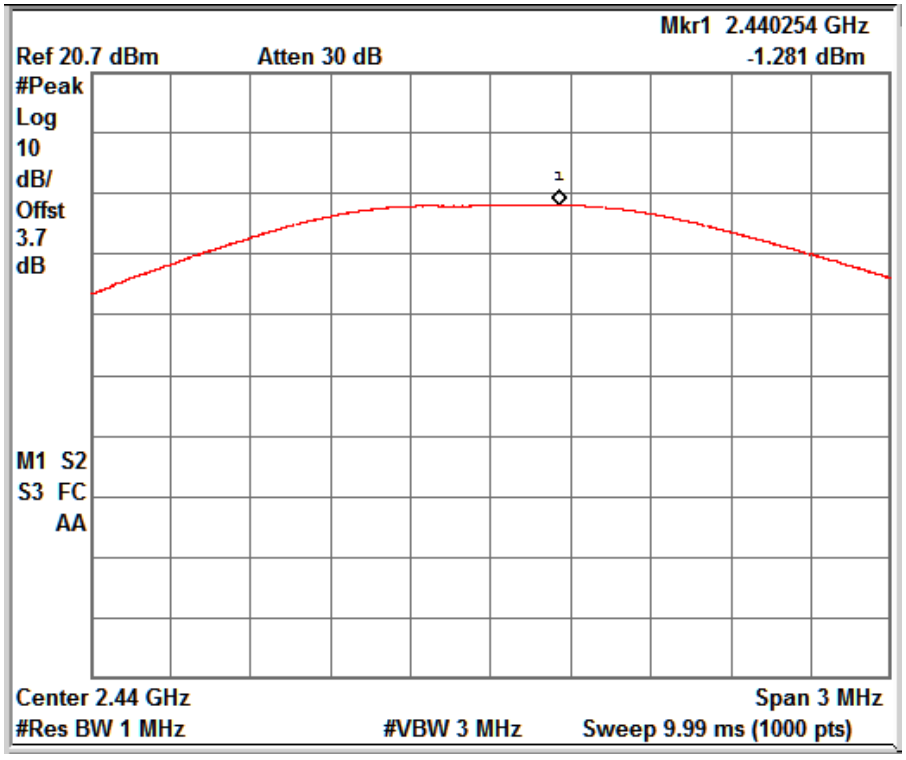
Cable Loss considered in the test results

Test Result:

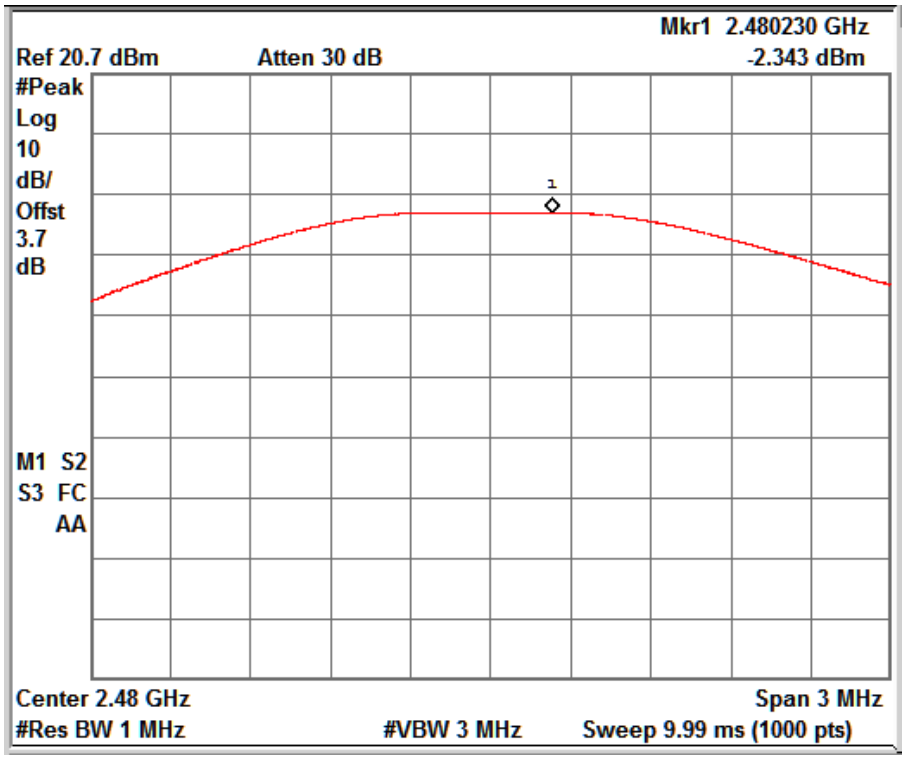
Channel Frequency (MHz)	Total Power (dBm)	Limit (dBm)	Margin (dB)
2402.00	-00.39	30.00	-30.40
2440.00	-01.28	30.00	-31.28
2480.00	-02.34	30.00	-32.34



Channel Frequency: 2402 MHz



Channel Frequency: 2440 MHz



Channel Frequency: 2480 MHz

Maximum Power Spectral Density

Result **Pass**

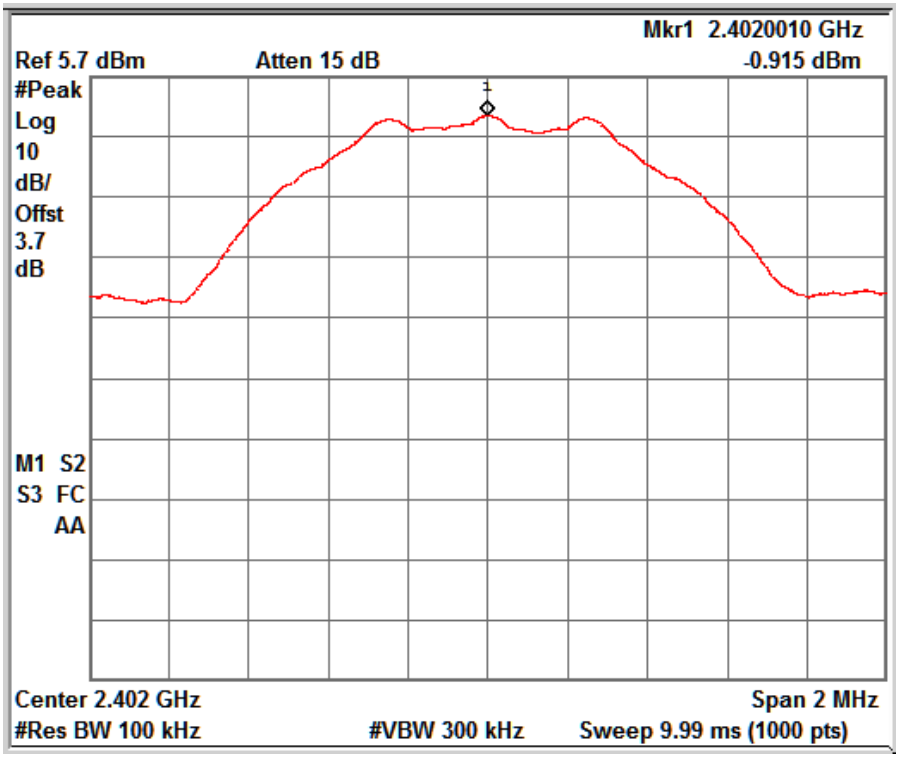
Test Specification	FCC Part 15.247 (e) & RSS 247 Issue 1,Section 5.2 (2)
Detector Function	Peak
Requirement	For digitally modulated systems, the power spectral density conducted from the intent antenna shall not be greater than 8 dBm.

Test Method:

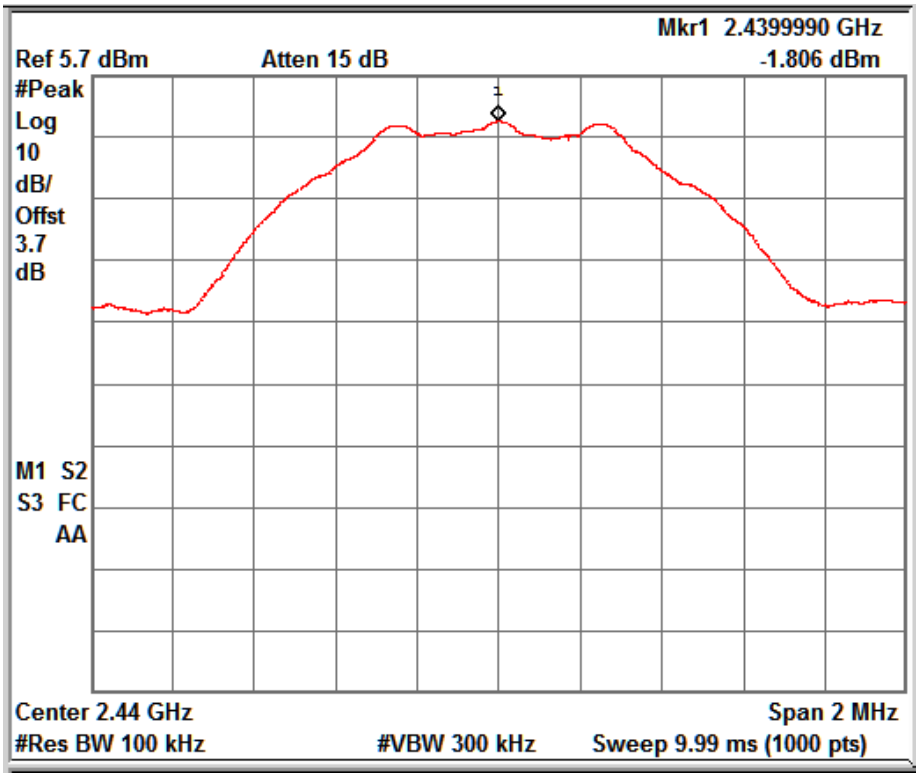
Cable Loss considered in the test results

Test Result:

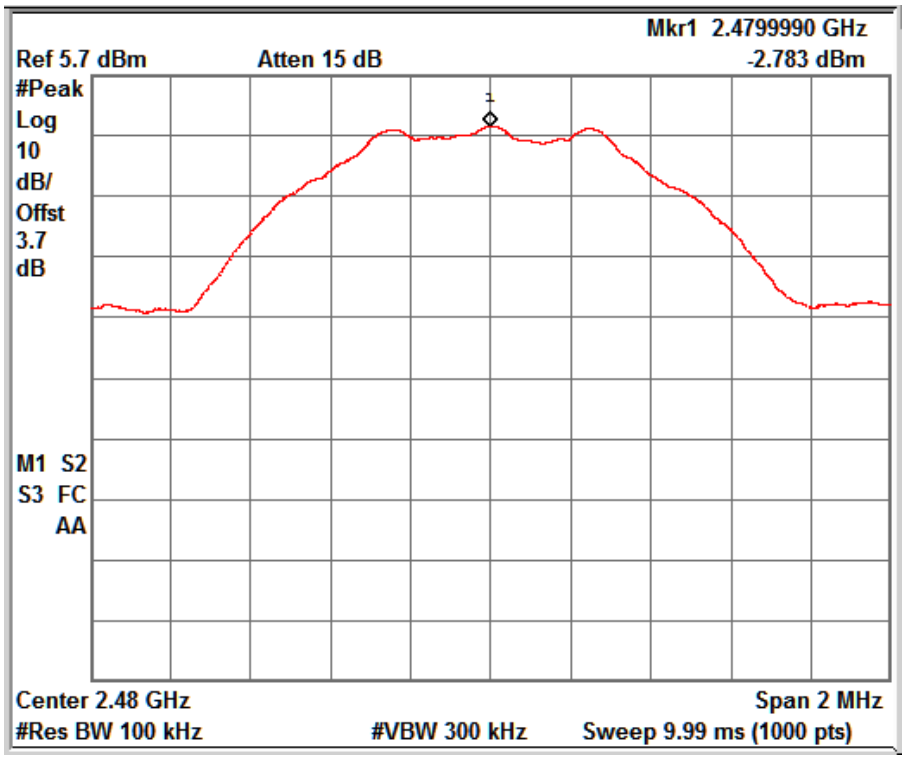
Channel Frequency (MHz)	Total PSD (dBm)	Limit (dBm)	Margin (dB)
2402.00	-00.91	8.00	08.91
2440.00	-01.80	8.00	09.80
2480.00	-02.78	8.00	10.78



Channel Frequency: 2402 MHz



Channel Frequency: 2440 MHz



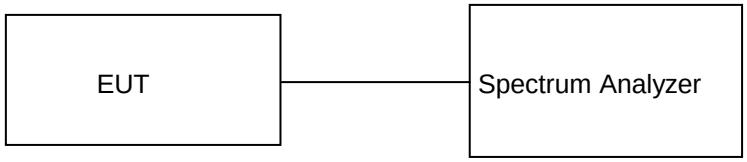
Channel Frequency: 2480 MHz

DTS Bandwidth

Result **Pass**

Test Specification	FCC Part 15.247 (a) (2) & RSS 247 Issue 1, Section 5.2 (1)
Requirement	The minimum 6 dB bandwidth shall be at least 500 kHz.

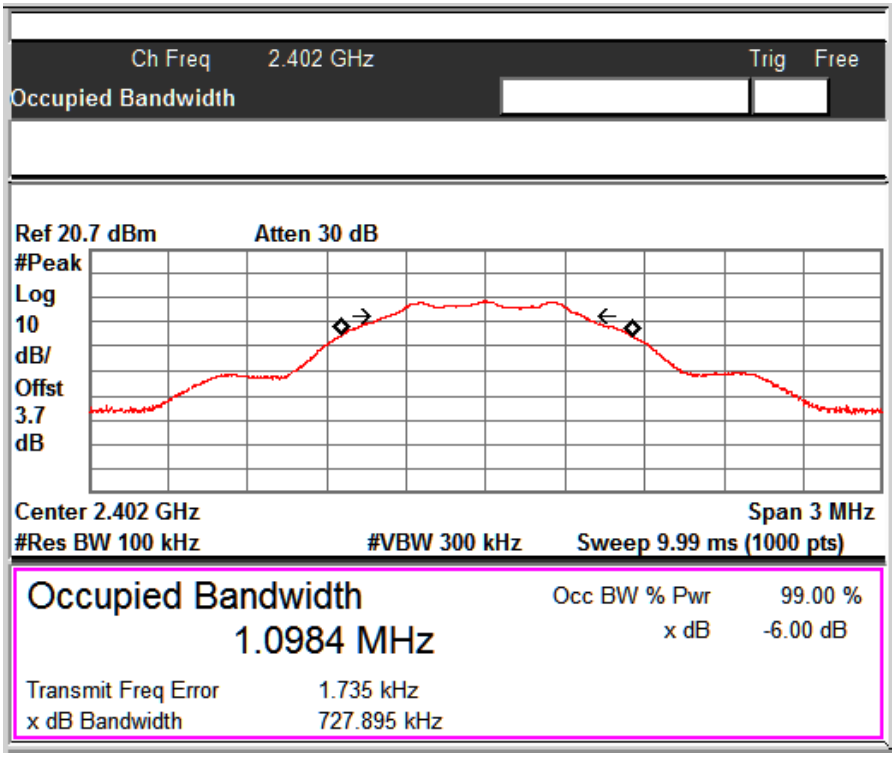
Test Method:



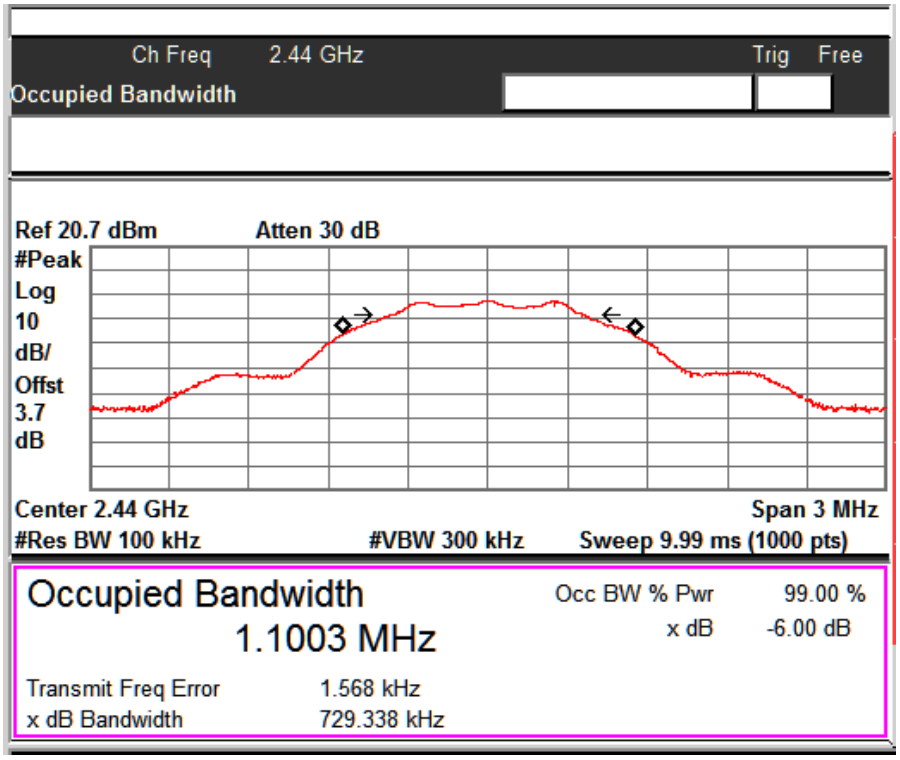
Cable Loss considered in the test results

Test Result:

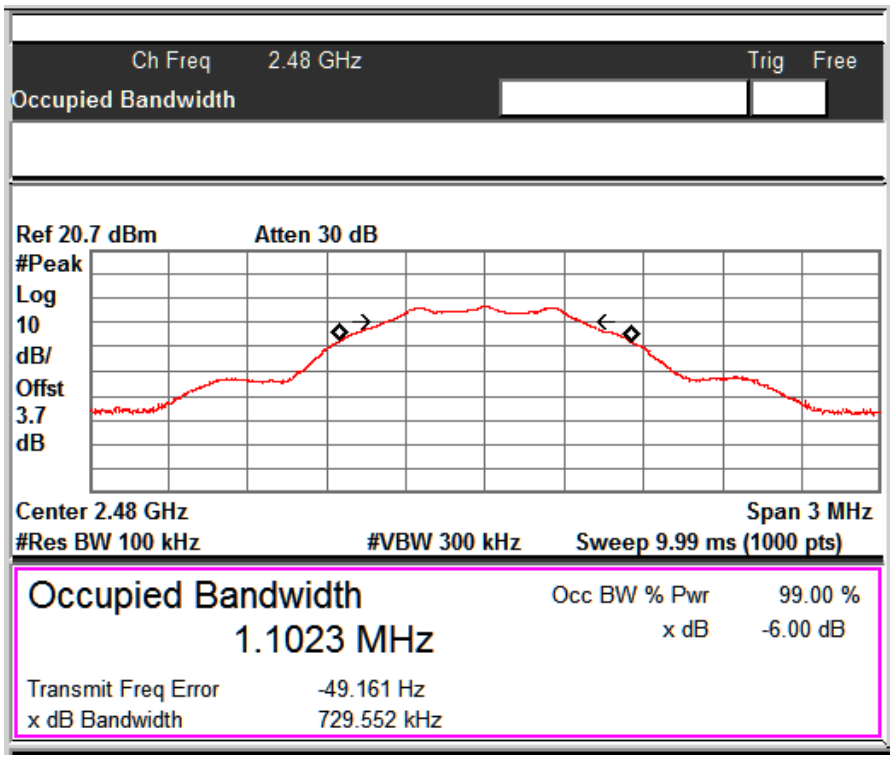
Channel Frequency (MHz)	6 dB Bandwidth (kHz)	99% OBW (MHz)
2402.00	727.89	01.09
2440.00	729.33	01.10
2480.00	729.55	01.10



Channel Frequency: 2402 MHz



Channel Frequency: 2440 MHz

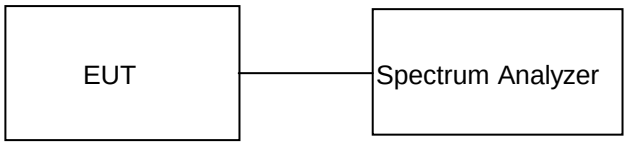


Channel Frequency: 2480 MHz

Emissions in non-restricted frequency bands
Result **Pass**

Test Specification	FCC Part 15.247(d) & RSS 247 Issue 1,Section 5.5
Detector Function	Peak
Requirement	In any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.

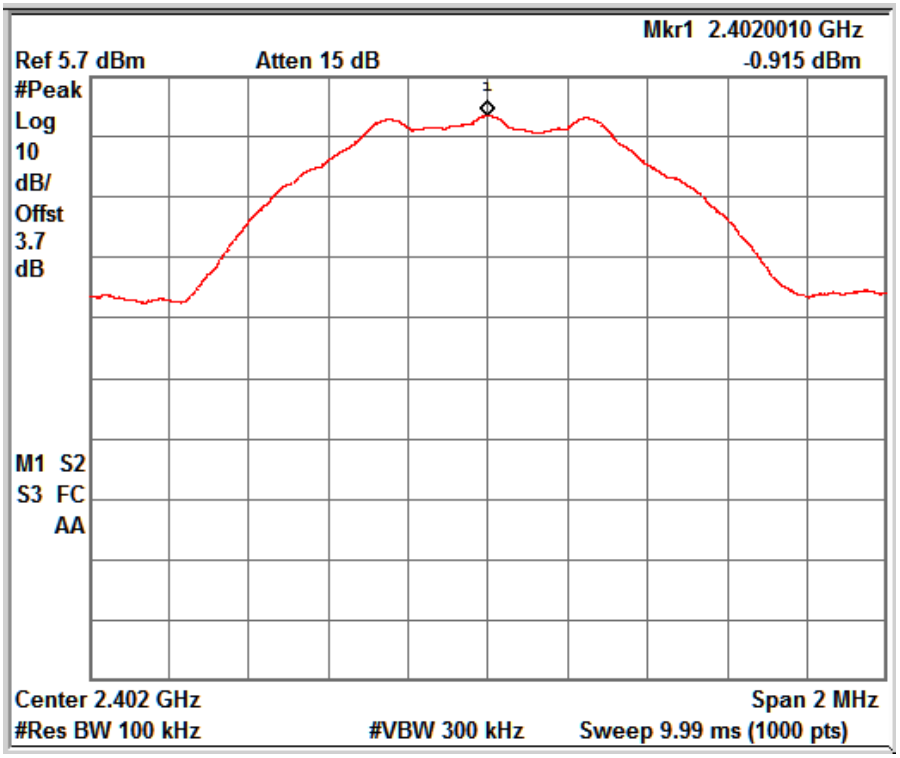
Test Method:



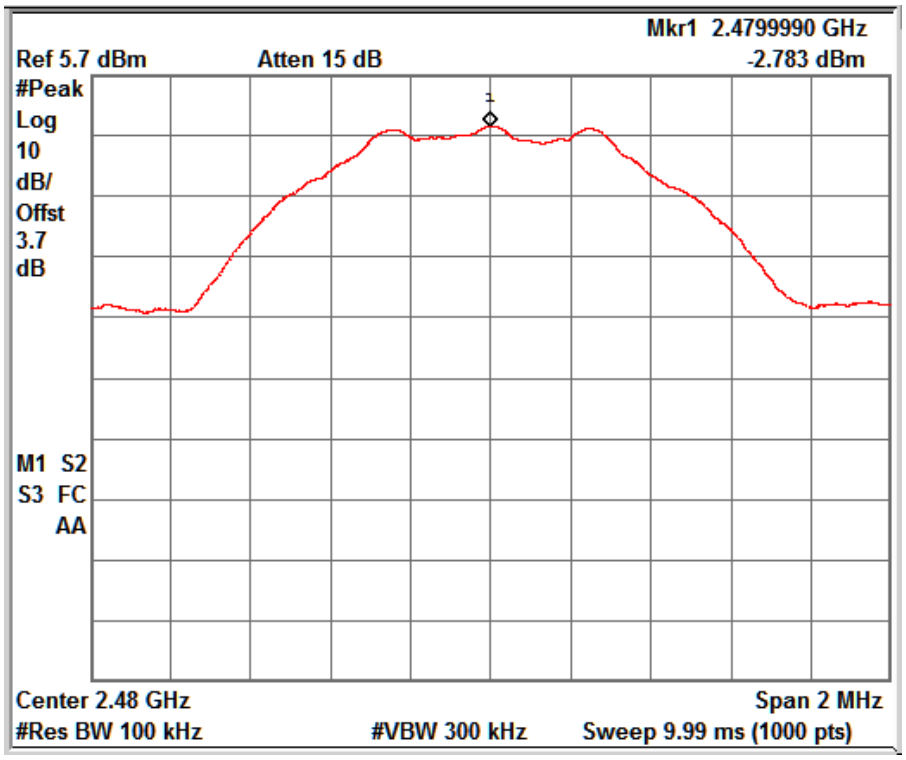
Cable Loss considered in the test results

Test Result:

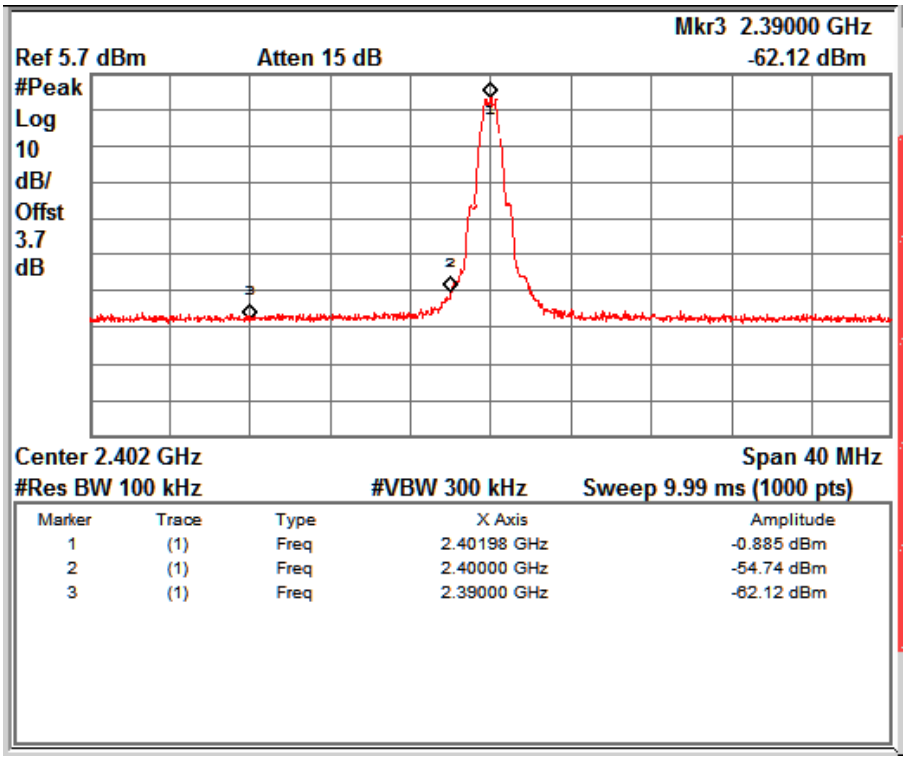
Channel Frequency (MHz)	Value at Band Edge		Reference PSD Value B (dBm)	Band Edge Value A~B (dBc)	Limit (dBc)
	Frequency (MHz)	Value A (dBm)			
2402	2400	-54.74	-00.91	55.64	20.00
2480	2483.50	-61.62	-02.78	64.40	20.00



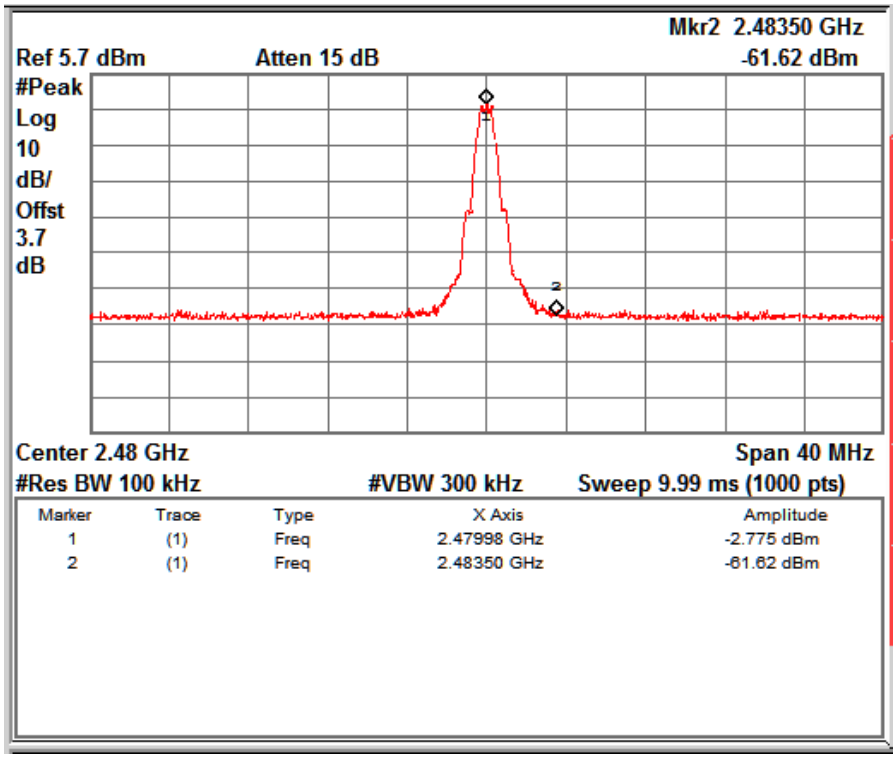
Reference Level Plot **Channel Frequency: 2402MHz**



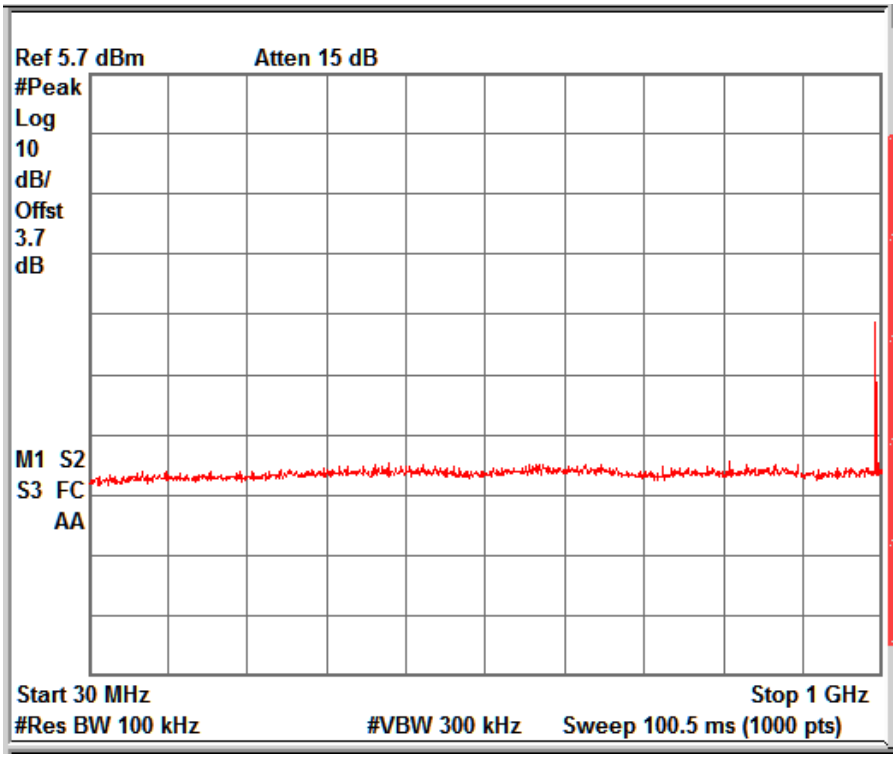
Reference Level Plot **Channel Frequency: 2480MHz**

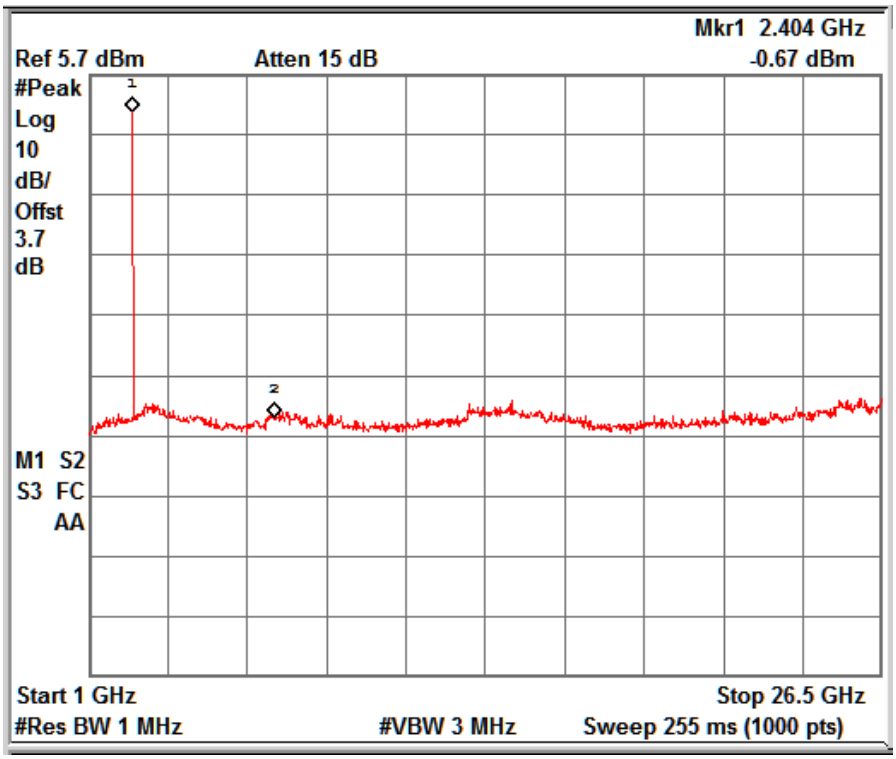


Channel Frequency 2402 MHz

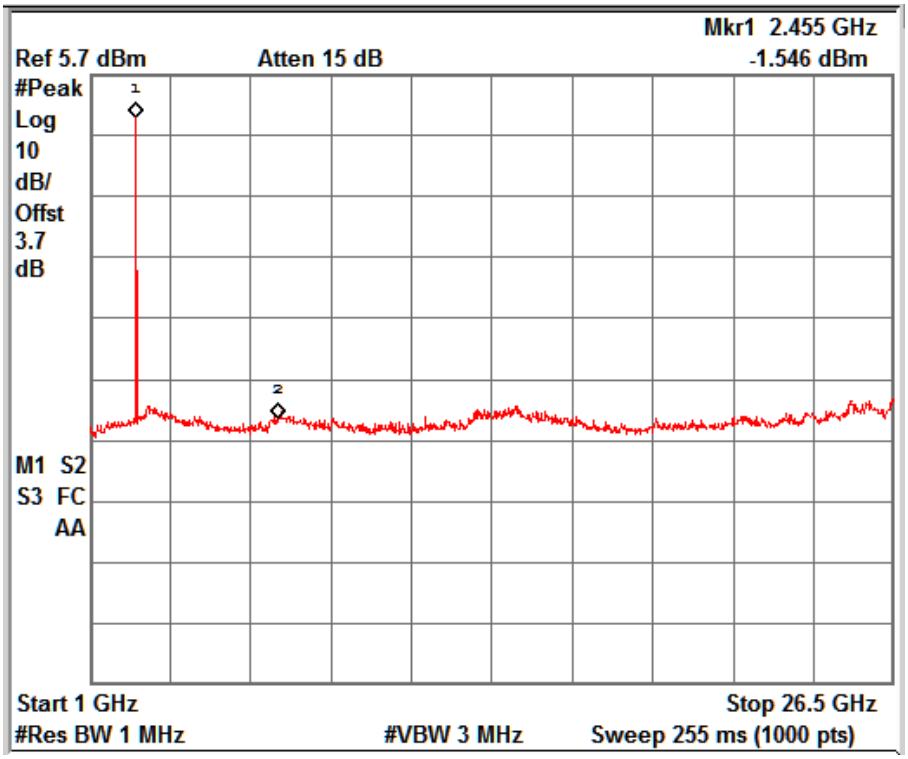


Channel Frequency 2480 MHz

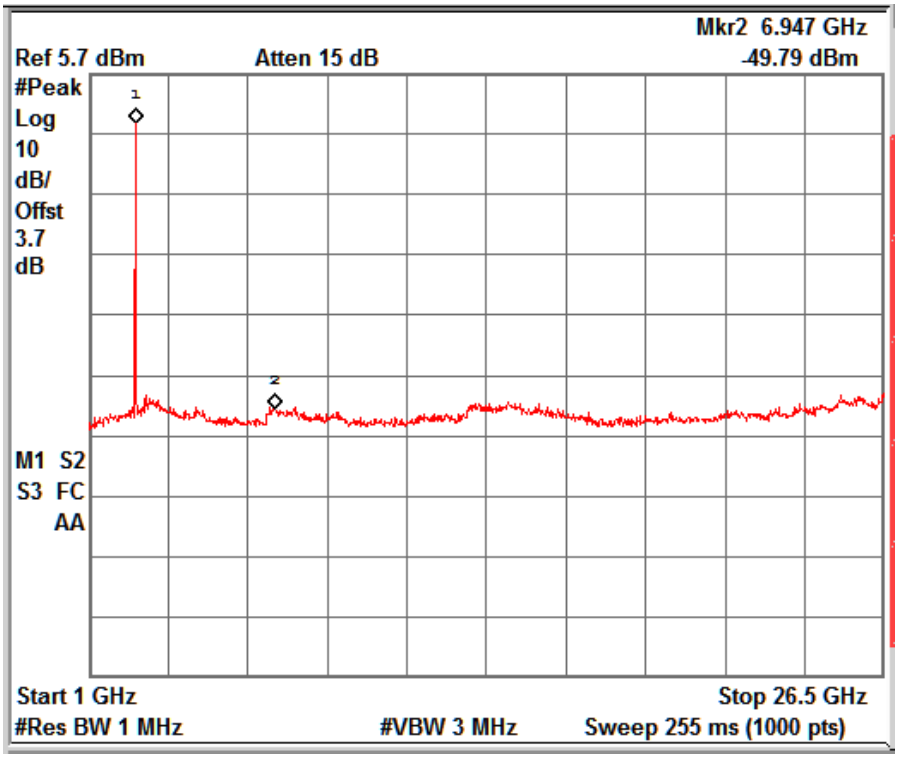




Channel Frequency 2402 MHz



Channel Frequency 2440 MHz



Channel Frequency 2480 MHz

Radiated Spurious Emissions and Restricted Bands of Operation
Result **Pass**

Test Specification	FCC Part 15.209 &15.205 & RSS-Gen Issue 4,Section 8.9/8.10
Test Method	ANSI C63.10-2013
Measurement Location	Semi Anechoic Chamber
Measuring Distance	3m
Detection	QP for frequency below 1GHz, Average for frequency above 1GHz
Requirement	As per the limits mentioned in the bellow table

Radiated Emission Limits:

Frequency (MHz)	Field strength (µV/m)	Field strength (dBµV/m)	Distance of Measurement (m)
0.009 – 0.490	2400/F(kHz)	48.50 – 13.80	300*
0.490 – 1.705	24000/F(kHz)	33.80 – 23.00	30*
1.705 -30	30	29.54	30*
30-88	100	40.0	3
88-216	150	43.5	3
216-960	200	46.0	3
Above 960	500	54.0	3

Remark: * The limit shows in the table above of frequency range 0.009 – 0.490, 0.490 – 1.705 MHz and 1.705-30MHz is at 300 meter, 30 meter and 30 meter range respectively, which corresponds to 88.50 – 53.80, 53.80 – 43.00 and 49.5dBµV/m at 3m range by extrapolation calculation and the measurement of loop antenna.

The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz Radiated emission limits in these three bands are based on measurements employing an average detector.

Test results:

For Frequency Range 9kHz – 30MHz

No emissions found in this frequency range.

For Frequency Range 30MHz – 1GHz

Test Performed on both Battery Mode & Power Adaptor Mode, only worst case test results are reported for the 1GB RAM Variant

Polarization	Frequency (MHz)	Emission (dBm)	Limit (dBµV/m)	Margin (dB)
Vertical	31.87	25.39	40.00	-14.61
	211.30	30.53	43.50	-12.97
Horizontal	32.66	22.06	40.00	-17.94
	211.06	39.85	43.50	-03.65
	217.35	38.62	46.00	-07.38

Test Performed on both Battery Mode & Power Adaptor Mode, only worst case test results are reported for the 2GB RAM Variant

Polarization	Frequency (MHz)	Emission (dBm)	Limit (dBµV/m)	Margin (dB)
Vertical	30.64	26.89	40.0	-13.11
	209.73	32.19	43.5	-11.31
Horizontal	35.62	25.81	40.0	-14.19
	210.82	40.67	43.5	-02.83
	216.01	39.27	46.0	-06.73

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For frequency above 1GHz

Test results for worst case data rate are listed below.

Channel	Polarization	Frequency (MHz)	Measured Emission Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)
Low	V	2390(Pk)	36.20	74	-37.80
		2390(Av)	24.02	54	-29.98
		2402(Pk)	78.30	*	-
		2402(Av)	74.31	*	-
		4804(Pk)	49.91	74	-24.09
		4804(Av)	36.79	54	-17.21
	H	2390(pk)	35.41	74	-38.59
		2390(Av)	23.84	54	-30.16
		2402(Pk)	78.67	*	-
		2402(Av)	74.23	*	-
		4804(Pk)	49.84	74	-24.16
		4804(Av)	36.86	54	-17.14
Mid	V	2440(Pk)	83.70	*	-
		2440(Av)	79.74	*	-
		4880(Pk)	50.43	74	-23.57
		4880(Av)	37.24	54	-16.76
	H	2440(Pk)	76.81	*	-
		2440(Av)	72.75	*	-
		4880(Pk)	50.57	74	-23.43
		4880(Av)	37.24	54	-16.76
High	V	2483.5(Pk)	35.72	74	-38.28
		2483.5(Av)	24.47	54	-29.53
		2480(Pk)	77.41	*	-
		2480(Av)	73.49	*	-
		4960(Pk)	50.28	74	-23.72
		4960(Av)	37.42	54	-16.58
	H	2483.5(Pk)	36.24	74	-37.76
		2483.5(Av)	24.08	54	-29.92
		2480(Pk)	76.19	*	-
		2480(Av)	71.98	*	-
		4960(Pk)	50.95	74	-23.05
		4960(Av)	37.51	54	-16.49

Conducted Emission Test on A.C. Power Line
Result **Pass**

Test Specification :	FCC Part 15.207 & RSS-Gen Issue 4 section 8.8
Test Method :	ANSI C63.10-2013
Testing Location :	Screened room
Measurement Bandwidth :	9kHz
Frequency Range :	150kHz – 30MHz
Supply Voltage :	120VAC,60Hz

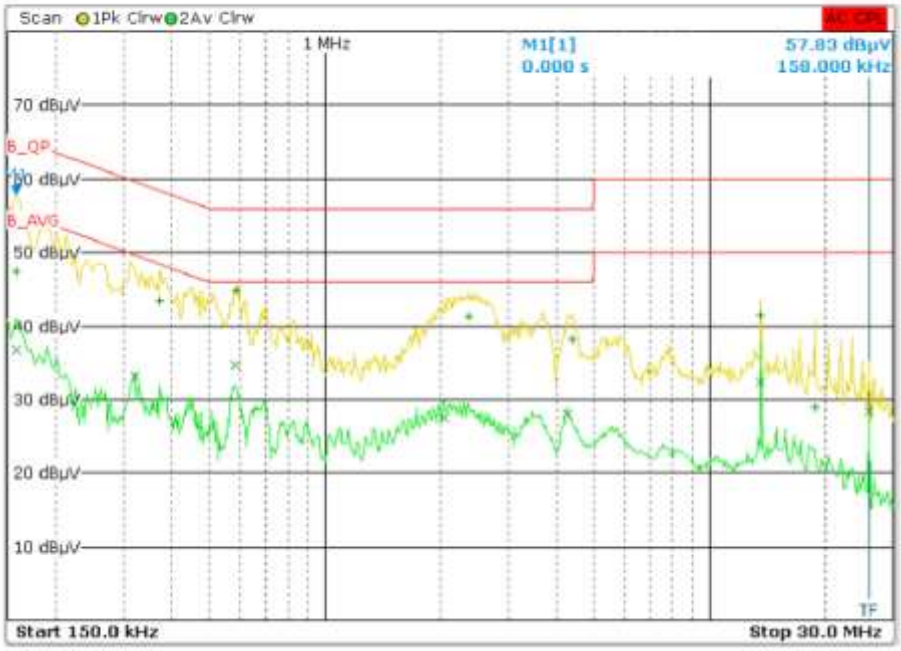
Conducted Emission Limits:

Frequency of Emission (MHz)	QP Limit (dBµV)	AV Limit (dBµV/m)
0.15 – 0.5	66 – 56*	56 – 46*
0.5 – 5	56	46
5 – 30	60	50

* Decreases with the logarithm of the frequency

Test Results:

Scan Diagram



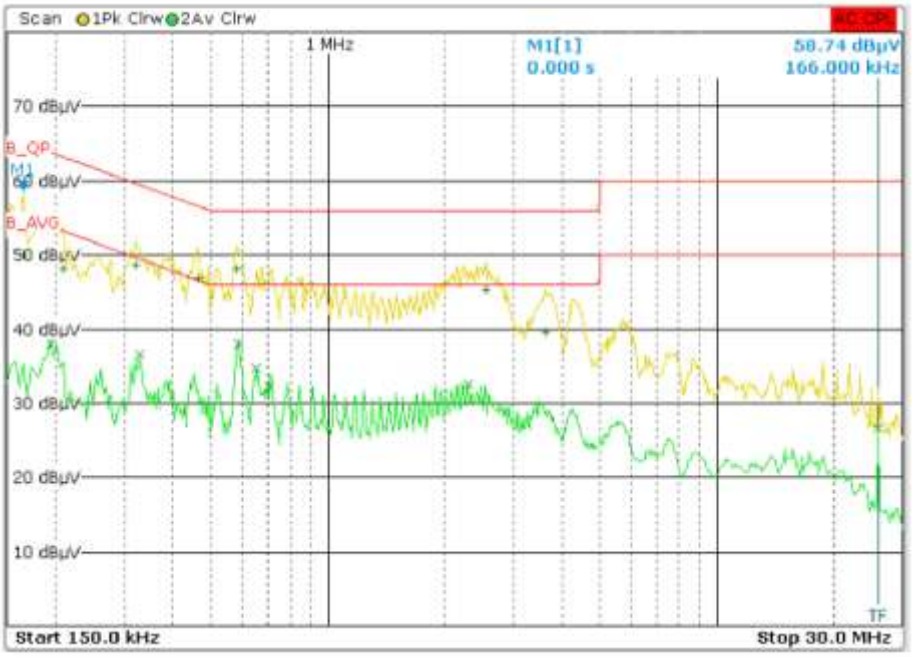
Final Results

Meas Time	1.0 s
Margin	6.0 dB
Peaks	25

Trace	Frequency	Level (dBµV)	Phase	Detector	Delta Limit/dB
1	586.000000000 kHz	44.72		Quasi Peak	-11.28
2	582.000000000 kHz	34.60		Average	-11.40
1	2.370000000 MHz	41.32		Quasi Peak	-14.68
1	374.000000000 kHz	43.36		Quasi Peak	-15.05
2	322.000000000 kHz	33.19		Average	-16.47
2	13.558000000 MHz	32.44		Average	-17.56
1	4.406000000 MHz	38.24		Quasi Peak	-17.76
2	4.270000000 MHz	28.08		Average	-17.92
1	158.000000000 kHz	47.36		Quasi Peak	-18.21
2	2.038000000 MHz	27.56		Average	-18.44
1	13.558000000 MHz	41.48		Quasi Peak	-18.52
2	158.000000000 kHz	36.74		Average	-18.83
2	26.002000000 MHz	28.45		Average	-21.55
1	18.762000000 MHz	28.95		Quasi Peak	-31.05

Mode: Line

Scan Diagram



Final Results

Meas Time 1.0 s
Margin 6.0 dB
Peaks 25

Trace	Frequency	Level (dBµV)	Phase	Detector	Delta Limit/dB
1	582.000000000 kHz	48.09		Quasi Peak	-7.91
2	586.000000000 kHz	37.92		Average	-8.08
1	466.000000000 kHz	46.93		Quasi Peak	-9.65
1	2.542000000 MHz	45.38		Quasi Peak	-10.62
1	322.000000000 kHz	48.55		Quasi Peak	-11.11
2	654.000000000 kHz	34.62		Average	-11.38
2	330.000000000 kHz	36.59		Average	-12.86
2	2.282000000 MHz	32.58		Average	-13.42
2	706.000000000 kHz	32.20		Average	-13.80
1	210.000000000 kHz	48.12		Quasi Peak	-15.09
1	166.000000000 kHz	49.96		Quasi Peak	-15.20
2	194.000000000 kHz	38.08		Average	-15.78
1	3.630000000 MHz	39.48		Quasi Peak	-16.52
2	26.002000000 MHz	26.62		Average	-23.38

Mode: Neutral

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