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FCC PART 15.249

TEST REPORT

APPLICANT	RANGER ELECTRONIC COMMUNICATIONS, INC.
ADDRESS	70 PEI NEI STREET SHULIN TAIPEI HSIEN 238 TAIWAN
FCC ID:	C2R-310-139
PRODUCT DESCRIPTION	CB RADIO WITH BLUETOOTH
DATE SAMPLE RECEIVED	12/2/2008
DATE TESTED	12/3/2008
TESTED BY	Richard Block
APPROVED BY	Mario de Aranzeta
TIMCO REPORT NO.	2837AUT8TestReport.doc
TEST RESULTS	☒ PASS ☐ FAIL

ACCREDITED
Certificate # 0955-01

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GENERAL REMARKS

The attached report shall not be reproduced except in full without the written permission of Timco Engineering, Inc.

SUMMARY

The device under test does:
☒ fulfill the general approval requirements as identified in this test report
☐ not fulfill the general approval requirements as identified in this test report

ATTESTATION

This equipment has been tested in accordance with the standards identified in the referenced test report. To the best of my knowledge and belief, these tests were performed using the measurement procedures described in this report and demonstrate that the equipment complies with the appropriate standards.

All instrumentation and accessories used to test products for compliance to the indicated standards are calibrated regularly in accordance with ISO 17025 requirements.

I attest that the necessary measurements were made by me or under my supervision, at Timco Engineering, Inc. located at 849 N.W. State Road 45, Newberry, Florida 32669 USA.

ACCREDITED
Testing Certificate #0955-01

AUTHORIZED BY: Mario de Aranzeta

SIGNATURE:

FUNCTION: Lab Supervisor/ Test Engineer

DATE: 12/4/2008

REPORT SUMMARY

Disclaimer:	The test results relate only to the items tested.
Purpose of Test:	To demonstrate that the DUT is in compliant with FCC Pt 15.249 requirements.
Applicable Standards:	FCC Pt 15.249, ANSI C63.4: 2003, ANSI TIA-603: 2004, FCC Pt 15.109, RSS-210, RSS-GEN
Related Reports:	N/A

TEST ENVIRONMENT AND TEST SETUP

Test Facilities:	All measurements were made at one or more of the test sites of TIMCO ENGINEERING INC. located at 849 N.W. State Road 45, Newberry, FL 32669.
Laboratory Test Conditions:	Temperature: 26°C, Humidity: 55%
Test Exercise:	The DUT was set in continuous transmit mode of operation.
Deviation to the Standards:	There was no deviation from the standard.
Modification to the DUT:	No modification was made.
Supporting Accessories:	None

DUT DESCRIPTION

Applicant:	RANGER ELECTRONIC COMMUNICATIONS, INC.
Product Description:	BLUETOOTH ACCESSORY INSTALLED IN A CB TRANSCEIVER
FCC ID:	C2R-310-139
Operating Frequency:	2.402 – 2.480 GHz
EUT Power Source:	Primary Power – DC
	Secondary – 13.8V DC
Test Item:	Production
Type of Equipment	Mobile
Antenna	(Fixed) integral chip antenna
Antenna Connector	None

EMC EQUIPMENT LIST

Device	Manufacturer	Model	Serial Number	Cal/Char Date	Due Date
3/10-Meter OATS	TEI	N/A	N/A	Listed 3/20/07	3/19/10
3-Meter OATS	TEI	N/A	N/A	Listed 1/11/06	1/10/09
3-Meter Semi-Anechoic Chamber	Panashield	N/A	N/A	Listed 5/11/07	5/10/10
Analyzer Tan Tower Spectrum Analyzer	HP	8566B Opt 462	3138A07786 3144A20661	CAL 11/30/07	11/30/09
Analyzer Tan Tower RF Preselector	HP	85685A	3221A01400	CAL 11/30/07	11/30/09
Analyzer Tan tower Quasi-Peak Adapter	HP	85650A	303A01690	CAL 11/30/07	11/30/09
Antenna: Biconnical	Eaton	94455-1	1057	CAL 12/12/07	12/12/09
Antenna: Biconnical	Eaton	94455-1	1096	CAL 10/11/06	10/11/08
Antenna: Biconnical	Electro-Metrics	BIA-25	1171	CAL 7/18/07	7/18/09
Antenna: Double-Ridged Horn	Electro-Metrics	RGA-180	2319	CAL 7/18/07	7/18/09
LISN	Electro-Metrics	ANS-25/2	2604	CAL 10/5/06	10/5/08
LISN	Electro-Metrics	EM-7820	2682	CAL 7/23/07	7/23/09
Antenna: Log-Periodic	Eaton	96005	1243	CAL 12/14/07	12/14/09
Receiver	R & S	ESIB40		11/25/2007	11/25/2009

TEST PROCEDURES

Radiation Interference: ANSI C63.4-2003 using a spectrum analyzer, a preselector, a quasi-peak adapter, and an appropriate antenna. The analyzer was calibrated in dB above a microvolt at the output of the antenna. The resolution bandwidth was 100 kHz with an appropriate sweep speed and the video bandwidth was 300 kHz up to 1 GHz and 1 MHz with a video BW of 3 MHz above 1 GHz. When an emission was found, the table was rotated to produce the maximum signal strength. The antenna was placed in both the horizontal and vertical planes and the worse case emissions were reported. The spectrum was searched to at least the tenth (10) harmonic of the fundamental.

Formula Of Conversion Factors: The field strength at 3m was established by adding the meter reading of the spectrum analyzer (which is set to read in units of dBuV) to the antenna correction factor supplied by the antenna manufacturer. The antenna correction factors are stated in terms of dB. The gain of the preselector was accounted for in the spectrum analyzer meter reading.

Example:			
Freq (MHz)	Meter Reading	+ ACF	+ CL = FS
33	20 dBuV	+ 10.36 dB	+ 0.5 = 30.86 dBuV/m @ 3m

Power Line Conducted Interference: The procedure used was ANSI C63.4-2003 using a 50uH LISN. Both lines were observed. The bandwidth of the spectrum analyzer was 10kHz with an appropriate sweep speed. The spectrum was scanned from 0.15 to 30 MHz.

Occupied Bandwidth: A small sample of the transmitter output was fed into the spectrum analyzer and the attached plot was printed. The vertical scale is set to -10 dBm per division.

ANSI C63.4-2003 10.1 Measurement Procedures: The DUT was placed on a table 80 cm high and with dimensions of 1m by 1.5m. The DUT was placed in the center of the table (1.5m side). The table used for radiated measurements is capable of continuous rotation.

When an emission was found, the table was rotated to produce the maximum signal strength. At this point, the antenna was raised and lowered from 1m to 4m. The antenna was placed in both the horizontal and vertical planes.

POWER LINE CONDUCTED INTERFERENCE

RULES PART NO.: 15.207, RSS-210, RSS-GEN

REQUIREMENTS:

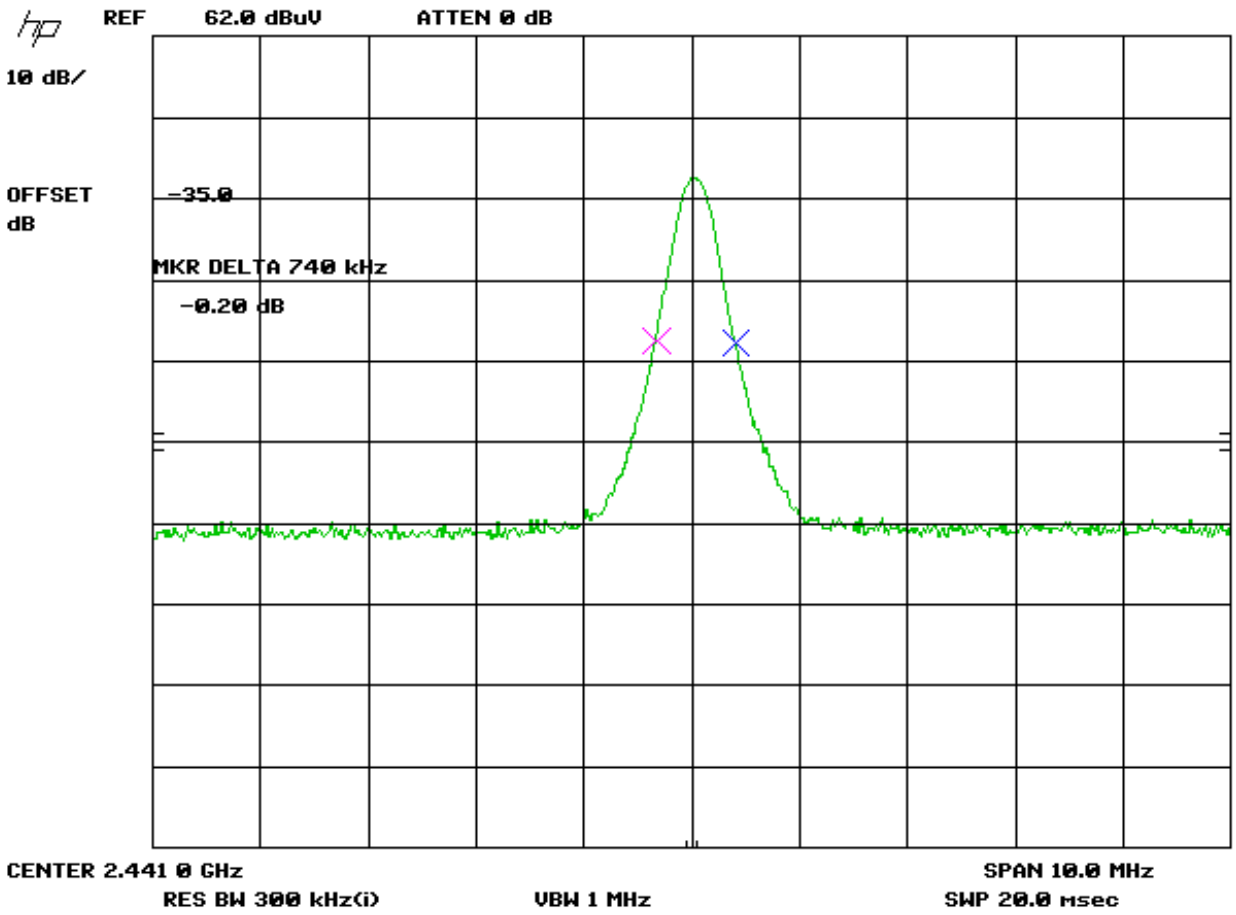
Emission Frequency (MHz)	Conducted Limit (dBμV)	
	Quasi-peak (QP)	Average (AV)
0.15 – 0.5	66 to 56 *	56 to 46 *
0.5 – 5	56	46
5 – 30	60	50
* Decreases with the logarithm of the frequency.		

TEST DATA: Not applicable to this device.

OCCUPIED BANDWIDTH

Rules Part No.: 15.249 (d)

TEST DATA: See the following plot(s)



Three places in the band were measured and the worst case presented above.

FIELD STRENGTH OF SPURIOUS EMISSIONS

RULES PART NO.: 15.249, 15.209, RSS-210

REQUIREMENTS:

Frequency	Limits
Part 15.209	
9 to 490 kHz	2400/F (kHz) µV/m @ 300 meters
490 to 1705 kHz	24000/F (kHz) µV/m @ 30 meters
1705 kHz to 30 MHz	29.54 dBµV/m @ 30 meters
30 – 88	40.0 dBµV/m @ 3 meters
80 – 216	43.5 dBµV/m @ 3 meters
216 – 960	46.0 dBµV/m @ 3 meters
Above 960	54.0 dBµV/m @ 3 meters
Part 15.249	
Fundamental 902 – 928 MHz	94.0 dBµV/m @ 3 meters
Fundamental 2.4 – 2.4835 MHz	94.0 dBµV/m @ 3 meters
Harmonics	54.0 dBµV/m @ 3 meters

Test Data:

Tuned Frequency MHz	Emission Frequency MHz	Meter Reading dBuV	Ant. Polarity	Coax Loss dB	Correction Factor dB	Field Strength dBuV/m	Margin dB
2,402.0	2,402.00	45.1	H	3.18	32.25	80.53	13.47
2,402.0	2,402.00	45.9	V	3.18	32.25	81.33	12.67
2,402.0	4,804.00	9.6	H	4.90	34.10	48.60	5.40
2,402.0	4,804.00	12.2	V	4.90	34.10	51.20	2.80
2,402.0	7,206.00	4.7	V	5.72	36.04	46.46	7.54
2,402.0	7,206.00	5.3	H	5.72	36.04	47.06	6.94
2,402.0	9,608.00	4.8	H	6.78	36.71	48.29	5.71
2,402.0	9,608.00	5.2	V	6.78	36.71	48.69	5.31
2,402.0	12,010.00	3.5	H	7.81	38.71	50.02	3.98
2,402.0	12,010.00	3.8	V	7.81	38.71	50.32	3.68
2,441.0	2,441.00	44.9	V	3.21	32.35	80.46	13.54
2,441.0	2,441.00	46.4	H	3.21	32.35	81.96	12.04
2,441.0	4,882.00	9.9	H	4.94	34.10	48.94	5.06
2,441.0	4,882.00	14.6	V	4.94	34.10	53.64	0.36
2,441.0	7,323.00	4.8	H	5.79	36.06	46.65	7.35
2,441.0	7,323.00	5.9	V	5.79	36.06	47.75	6.25
2,441.0	9,764.00	3.9	H	6.83	36.86	47.59	6.41
2,441.0	9,764.00	6.0	V	6.83	36.86	49.69	4.31
2,441.0	12,205.00	3.9	H	7.94	38.86	50.70	3.30
2,441.0	12,205.00	5.7	V	7.94	38.86	52.50	1.50
2,480.0	2,480.00	45.5	V	3.24	32.45	81.19	12.61

Tuned Frequency MHz	**Emission Frequency MHz**	**Meter Reading dBuV**	**Ant. Polarity**	**Coax Loss dB**	**Correction Factor dB**	**Field Strength dBuV/m**	**Margin dB**
2,480.0	**2,480.00**	**48.3**	**H**	**3.24**	**32.45**	**83.99**	**10.01**
2,480.0	**4,960.00**	**7.4**	**H**	**4.98**	**34.10**	**46.48**	**7.52**
2,480.0	**4,960.00**	**10.9**	**V**	**4.98**	**34.10**	**49.98**	**4.02**
2,480.0	**7,440.00**	**5.8**	**H**	**5.86**	**36.09**	**47.75**	**6.25**
2,480.0	**7,440.00**	**6.4**	**V**	**5.86**	**36.09**	**48.35**	**5.65**
2,480.0	**9,920.00**	**3.7**	**H**	**6.88**	**37.02**	**47.60**	**6.40**
2,480.0	**9,920.00**	**4.8**	**V**	**6.88**	**37.02**	**48.70**	**5.30**
2,480.0	**12,400.00**	**3.9**	**V**	**8.08**	**39.02**	**51.00**	**3.00**
2,480.0	**12,400.00**	**3.9**	**H**	**8.08**	**39.02**	**51.00**	**3.00**

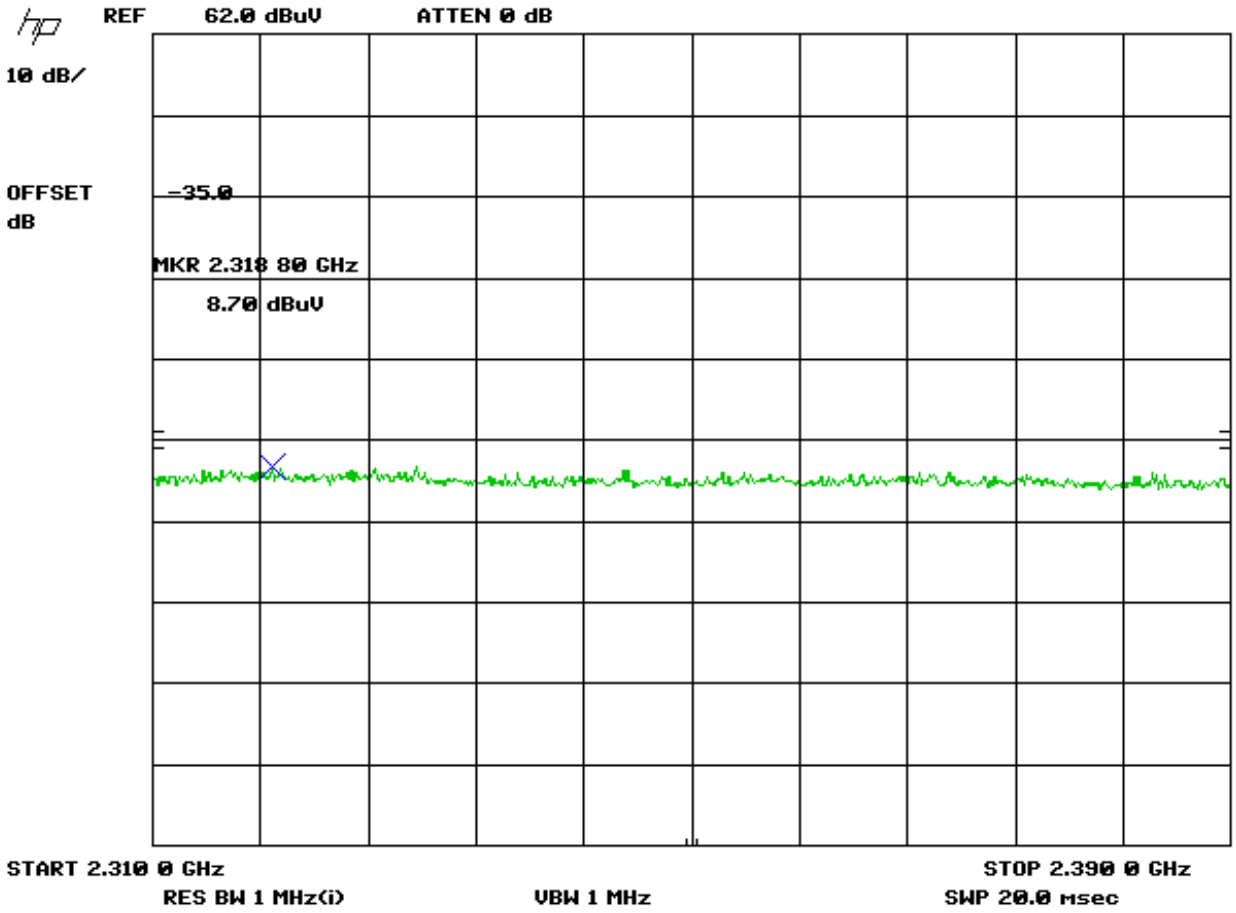
Harmonics were checked through the 10th harmonic.

RADIATED SPURIOUS EMISSIONS INTO ADJACENT RESTRICTED BAND

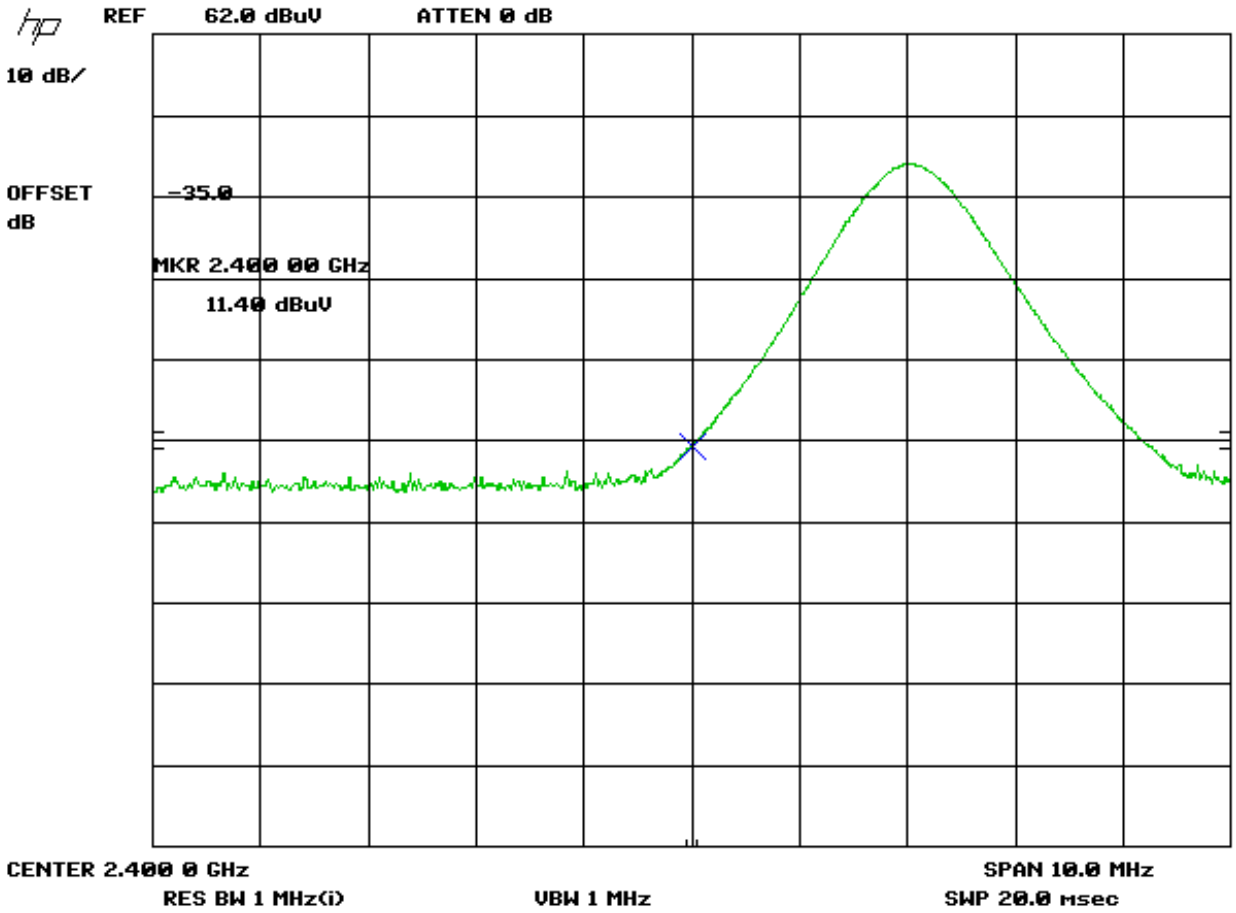
REQUIREMENTS: Emissions that fall in the restricted bands (15.205). These emissions must be less than or equal to 500 uV/m (54dBuV/m).

TEST DATA: The plots are presented below.

Lower bandedge

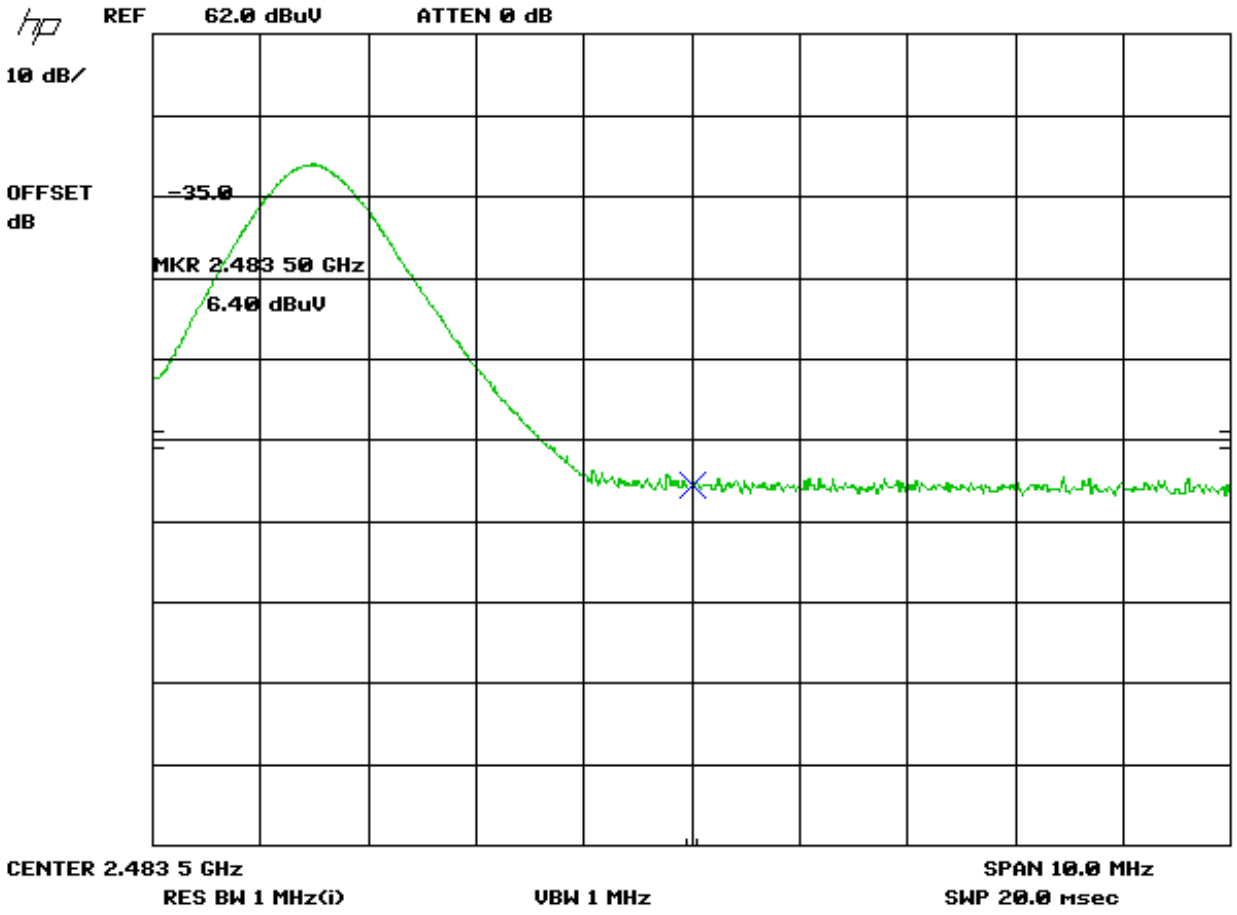


Tuned Frequency MHz	Emission Frequency MHz	Meter Reading dBuV	Ant. Polarity	Coax Loss dB	Correction Factor dB	Field Strength dBuV/m	Margin dB
2,402.0	2,318.80	8.7	V	3.12	32.03	43.85	10.15



Tuned Frequency MHz	Emission Frequency MHz	Meter Reading dBuV	Ant. Polarity	Coax Loss dB	Correction Factor dB	Field Strength dBuV/m	Margin dB
2,402.0	2,400.00	11.4	V	3.18	32.24	46.82	7.18

Upper bandedge



Tuned Frequency MHz	Emission Frequency MHz	Meter Reading dBuV	Ant. Polarity	Coax Loss dB	Correction Factor dB	Field Strength dBuV/m	Margin dB
2,480.0	2,483.50	6.4	V	3.24	32.46	42.10	11.90

RADIATED EMISSIONS TEST SETUP PHOTO