FCC CFR47 PART 15 SUBPART C

CERTIFICATION TEST REPORT

TEST REPORT

FOR

Intel®60GHz Wireless Module Adapter (Dock side)

MODEL NUMBER:
13100NGW
13100NGW LC

FCC ID: PD913100NG

REPORT NUMBER: 14U18424-3

ISSUE DATE: OCTOBER 21, 2014

Prepared for

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NVLAP LAB CODE 200065-0

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--	10/21/2014	Initial Issue	M. Heckrotte

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: Intel Mobile Communications
100 Center Point Circle, Suite 200
Columbia, SC 29210 USA

EUT DESCRIPTION: Intel®60GHz Wireless Module Adapter (Dock side)

MODEL: 13100NGW, 13100NGW LC

SERIAL NUMBER: 001500F7474DE (WGM)

DATE TESTED: AUGUST 11- OCTOBER 8, 2014

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
CFR 47 Part 15 Subpart C	Pass

UL Verification Services Inc. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL Verification Services Inc. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

Approved & Released For
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LAB ENGINEER
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2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10-2009, FCC CFR 47 Part 2, FCC CFR 47 Part 15, FCC KDB 200443 D02 RF Detection Method V01, FCC KDB 200443 Millimeter Wave Test Procedure.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 and 47266 Benicia Street, Fremont, California, USA. Line conducted emissions are measured only at the 47173 address. The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

47173 Benicia Street	47266 Benicia Street
☐ Chamber A	☐ Chamber D
☐ Chamber B	☒ Chamber E
☐ Chamber C	☐ Chamber F
	☐ Chamber G
	☐ Chamber H

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at http://ts.nist.gov/standards/scopes/2000650.htm.

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

4.2. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	UNCERTAINTY
Conducted Disturbance, 0.15 to 30 MHz	±3.52 dB
Radiated Disturbance, 30 to 1000 MHz	±4.94 dB

Uncertainty figures are valid to a confidence level of 95%.

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5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a 60GHz 802.11ad wireless module adapter that supports two identical RFEM antenna arrays with typical application intended for wireless docking stations for tablet and notebook PCs.

GENERAL INFORMATION

Power Requirements	3.3 VDC (3.135-3.465 VDC)
Frequencies generated or used by the EUT	Clock:1.32 GHz IF: 10.56 GHz VCO: 23.88, 24.96, 26.04 GHz LO2: 47.76, 49.92, 52.08 GHz Fo: 58.32 GHz, 60.48 GHz, 62.64 GHz

5.2. OUTPUT POWER

The antenna is integral thus radiated measurements are made. The EIRP was measured at the worst-case condition, thus the EIRP measurement conditions correspond to the maximum EUT antenna gain. Therefore the maximum antenna gain is used to calculate the Peak Output Power.

The highest peak conducted output power is 10.25 dBm (10.6mW).

5.3. DESCRIPTION OF ANTENNA

The antenna is an integral phased array antenna with a maximum gain of 15.45 dBi. Two identical antennas are provided for wider coverage. Only one antenna operates at a given time.

5.4. MODIFICATIONS

No modifications were made during testing.

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5.5. WORST-CASE MODE

The worst case mode/modulation was π/2 BPSK; Rate MCS0.

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
Laptop	Dell	E6430	30422459449	DoC
AC/DC Adapter	Dell	6TM1C	CN-06TM1C-72438	N/A
Express Card Adapt.	--	--	600010906	N/A
PCIe Ext. Board	Intel	PCB00284	2840614	N/A
Extender Board	Intel	CB00494	4945113-005	N/A
AC/DC Adapter	Delta Electronics	ADP-45 BE AA	--	N/A

I/O CABLES

I/O CABLE LIST						
Cable No.	**Port**	**No. of identical ports**	**Connector Type**	**Cable Type**	**Cable Length (m)**	**Remarks**
1	AC	1	EURO AC	Unshielded	0.9	N/A
2	DC	1	DC Power	Unshielded	1.8	N/A
3	AC	1	Parallel Blade	Unshielded	1.4	N/A
4	DC	1	DC Power	Unshielded	1.4	N/A
5	Data	1	Ribbon	Shielded	1	N/A
6	IF	2	X.FL	Shielded	0.5	EUT + Ant. Array connection

TEST SETUP

The EUT was connected to a laptop via an Express card adapter and ribbon cable to an Extender board upon which the EUT is mounted. The antenna arrays are connected to the EUT via I.F coax cables. The EUT was set up as shown in the following diagram.

Software on Laptop to conduct tests was Intel DRTU (Diagnostic and Regulatory Test Utility) Version 1.7.3-984.

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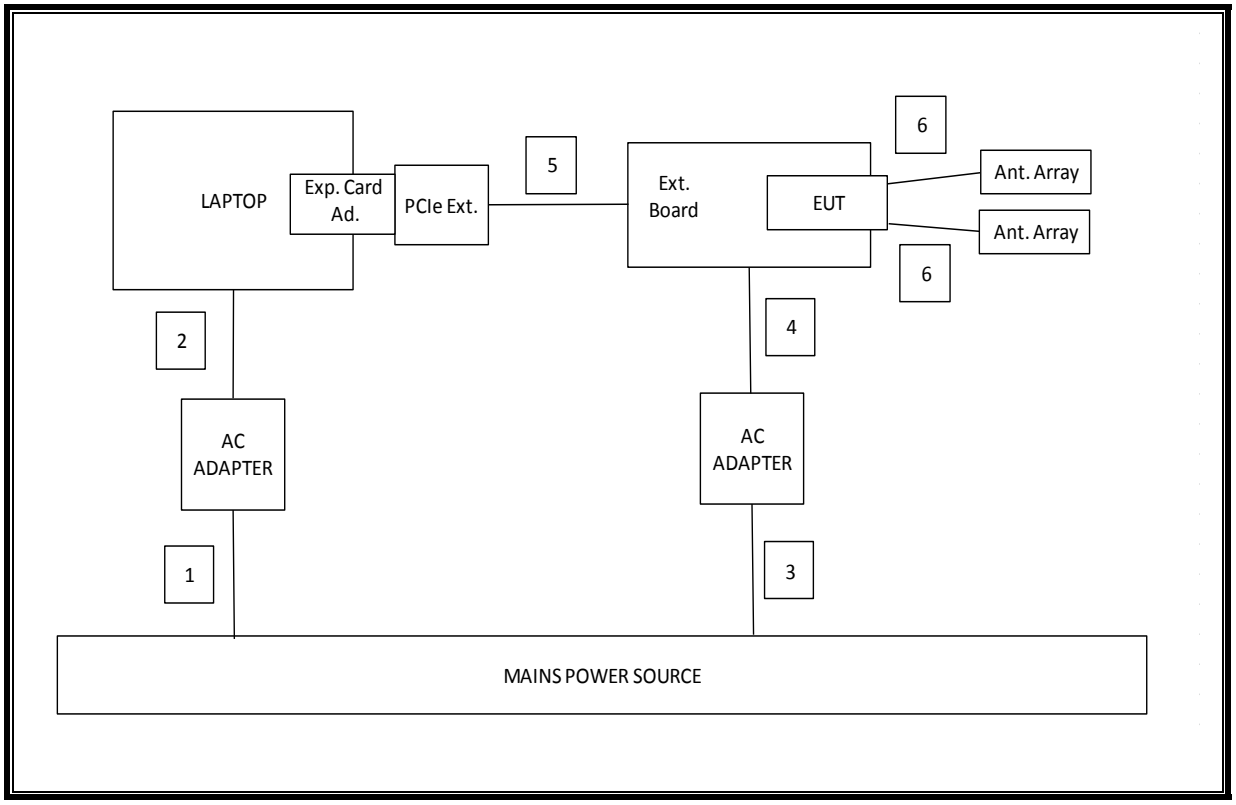
SETUP DIAGRAM FOR TESTS



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6. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

Test Equipment List				
Description	**Manufacturer**	**Model**	**S/N**	**Cal Due**
N9030A PXA Signal Analyzer	Agilent	N9030A	MY52350427	1/22/2015
Analog Signal Generator, 40 GHz	Agilent	E8257D	MY48050681	9/26/2015
Down Converter, 67 GHz	Agilent	MT-463	12020	CNR
mmWave Source 50 - 75 GHz	OML	S15MS-AG	80708-4	CNR
Mixer Diplexer for HP	OML	DPL.313B	N02429	CNR
Harmonic Mixer, 50 GHz	Agilent	11970Q	3003A03363	9/25/2014*
Harmonic Mixer, 75 GHz	Agilent	11970V	2521A01183	2/5/2015
Harmonic Mixer, 110 GHz	Agilent	11970W	2521A01314	2/13/2015
Harmonic Mixer, 90 to 140 GHz	OML	M08HWA	F90519-2	6/17/2015
Harmonic Mixer, 140 to 220 GHz	OML	M05HWA	G90519-1	6/17/2015
Single Average Power Meter	Agilent	N1913A	MY53100006	5/1/2015
Waveguide Power Sensor	Agilent	V8486A	MY52300008	5/6/2015
Power Sensor, 50 to 78 GHz	Agilent	V8486A	MY44420424	12/12/2014
Spectrum Analyzer, 40 GHz	Agilent	8564E	3943A01643	8/6/2015
Amplifier, 1 to 26.5GHz	Agilent	8449B	3008A04710	3/25/2015
Antenna, Horn 18 to 26.5GHz	ARA	MWH-1826/B	1049	11/26/2014
Amplifier	Miteq	NSP4000-SP2	924343	9/3/2015
Horn Antenna, 40GHz	ARA	MWH-2640/B	1029	7/15/2015
PXA Signal Analyzer	Agilent	N9030A-544	US51350187	5/2/2015
Antenna, Biconolog, 30MHz-1 GHz	Sunol Sciences	JB3	A022813-1	3/28/2015
Amplifier	Sonoma	310	323561	5/28/2015
Horn Antenna, 1-18GHz	ETS Lindgren	3117	143449	2/25/2015
RF PreAmplifier, 1-18GHz	Miteq	AFS42-00101800-25-S-42	T741	2/7/2015
Oscilloscope, 1GHz 4Ch Digital Storage Oscilloscope	Agilent	DSO9104A	MY51420123	7/2/2015
Low Pass Filter, 10MHz	Solar Electronics	6623-10	136101	3/26/2015
Low Noise Amplifier	VIVAtech	VTLN-018-FB	51	CNR
Waveguide switch	mi-Wave	530V/387	1332	CNR
MM-Wave Isolator	Millitech	FBI-15-RSES0	1734	CNR
50-75GHZ RF Detector	Millitech	DET-15-RPFWI	41	CNR
EMI Test Receiver, 9 kHz-7 GHz	R & S	ESCI 7	100935	9/16/2015
LISN, 30 MHz	FCC	50/250-25-2	114	1/17/2015
Spectrum Analyzer, PXA, 3Hz to 50GHz	Agilent	N9030A	MY5235047	9/13/2015
Chamber, Environmental	Cincinnati Sub Zero	ZPHS-8-3.5-SCT/WC	ZP131613	10/11/2014*
DC Power supply	Ametek	XT15-4	1319A02780	CNR
Volt Meter	Fluke	87V	23310087	3/21/2015

*spurious 40-50GHz and temp. stability test conducted before due date.

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7. APPLICABLE LIMITS AND TEST RESULTS

7.1. 6 dB BANDWIDTH

APPLICABLE RULE

§15.255 (e) (1) For the purposes of this paragraph (e)(1), emission bandwidth is defined as the instantaneous frequency range occupied by a steady state radiated signal with modulation, outside which the radiated power spectral density never exceeds 6 dB below the maximum radiated power spectral density in the band, as measured with a 100 kHz resolution bandwidth spectrum analyzer. The center frequency must be stationary during the measurement interval, even if not stationary during normal operation (e.g. for frequency hopping devices).

LIMIT

None; for reporting purposes only.

TEST PROCEDURE

The spectrum analyzer and external mixer are set up to measure the radiated output of the transmitter.

RESULTS

RFEM0

Channel	Frequency (GHz)	6 dB Bandwidth (MHz)
1	58.32	1310
2	60.64	1240
3	62.64	1310

RFEM1

Channel	Frequency (GHz)	6 dB Bandwidth (MHz)
1	58.32	1320
2	60.64	1170
3	62.64	1185

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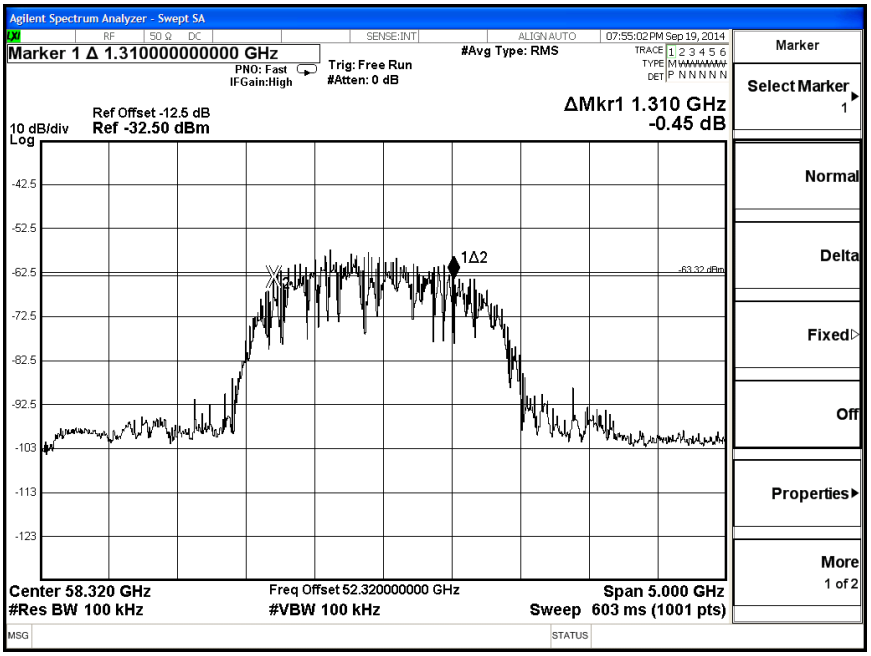
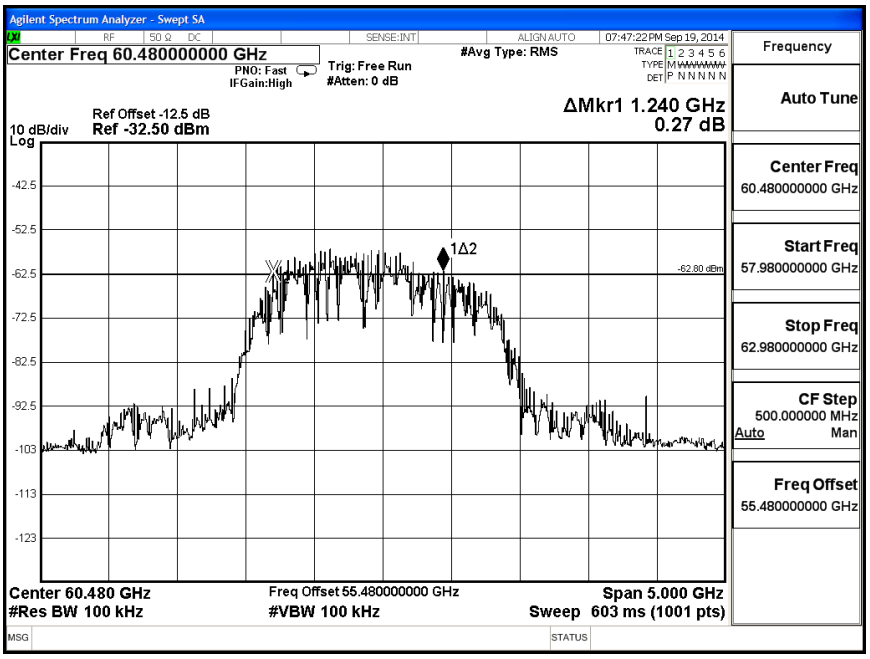
RFEM 0

6 dB BANDWIDTH

6 dB BANDWIDTH CHANNEL 1



6 dB BANDWIDTH CHANNEL 2



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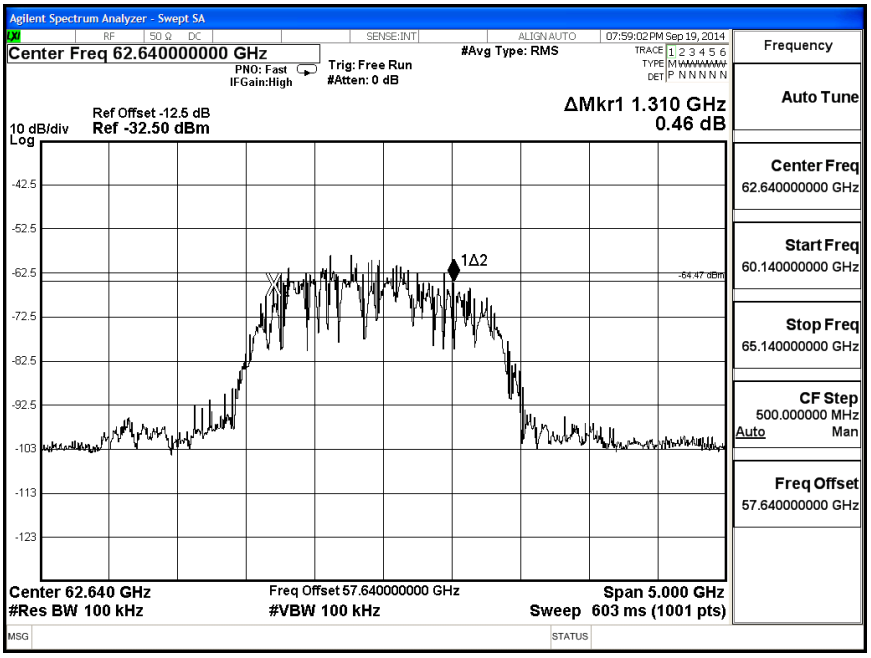
6 dB BANDWIDTH

6 dB BANDWIDTH CHANNEL 3



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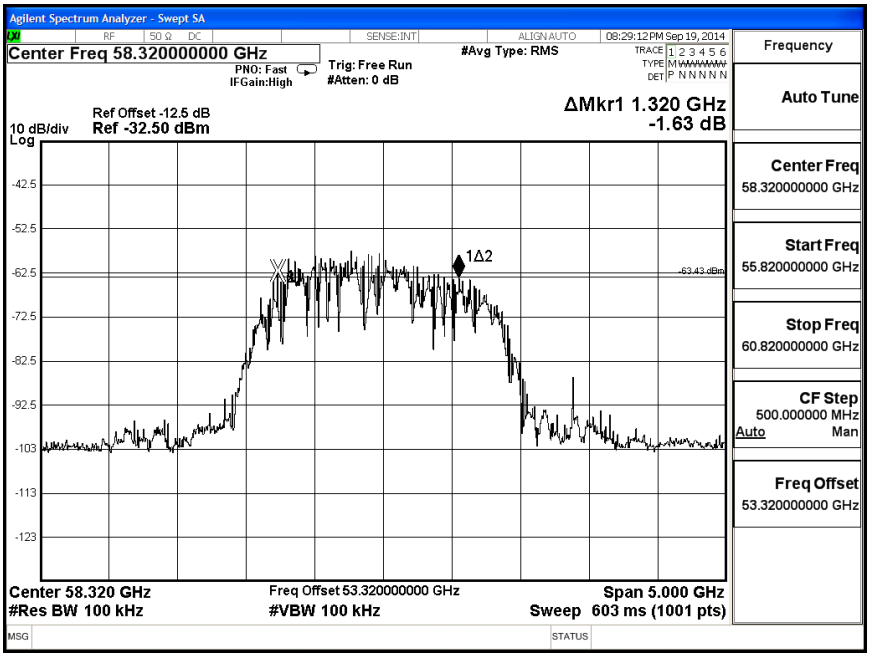
RFEM 1

6 dB BANDWIDTH

6 dB BANDWIDTH CHANNEL 1



6 dB BANDWIDTH CHANNEL 2

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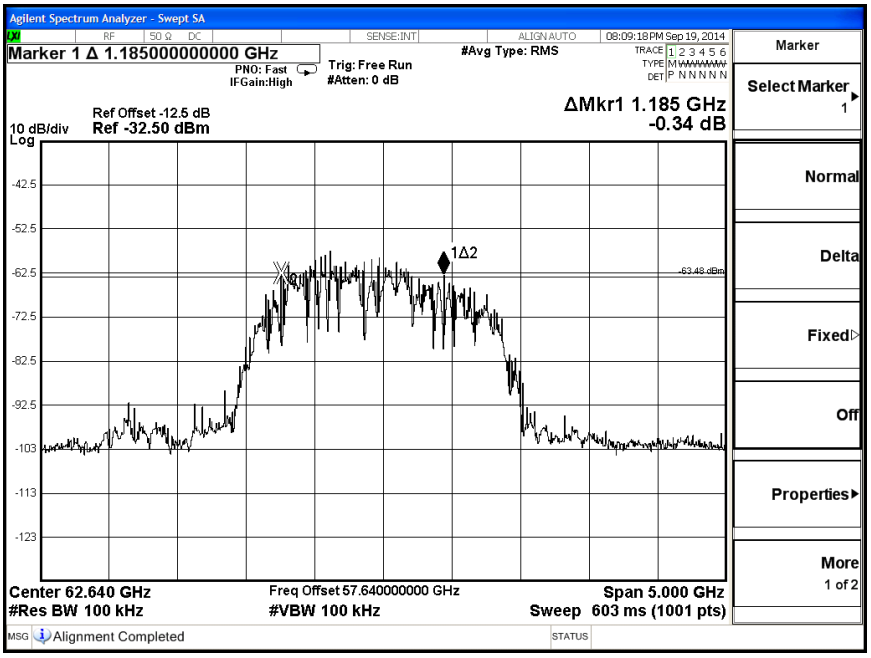
6 dB BANDWIDTH

6 dB BANDWIDTH CHANNEL 3



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7.2. POWER DENSITY

LIMIT

§15.255 (b) (1) Within the 57-64 GHz band, the average power density of any emission, measured during the transmit interval, shall not exceed 9 uW/cm^2, as measured 3 meters from the radiating structure, and the peak power density of any emission shall not exceed 18 uW/cm^2, as measured 3 meters from the radiating structure.

TEST PROCEDURE

§15.255 (b) (6) KDB 200443 D02 RF Detection Method V01

Measurements are made at a distance greater than or equal to the far field boundary distance.

The measured power level is converted to EIRP using the Friis equation:

$EIRP = P_T * G_T = (P_R / G_R) * (4 * Pi * D / \lambda)^2$
where:
G_R is the gain of the receive measurement antenna
D is the measurement distance
λ is the wavelength
The EIRP is converted to Power Density using the equation:
$P_D = EIRP / (4 * Pi * D_S^2)$
where:
D_S is the specification distance

FAR FIELD BOUNDARY CALCULATIONS

The far-field boundary is given in FCC KDB Publication 200443 as:

$R_{far\ field} = (2 * L^2) / \lambda$

where:

L = Largest Antenna Dimension, including the reflector, in meters
λ = wavelength in meters

Frequency (GHz)	L (m)	Lambda (m)	R (Far Field) (m)
58.32	0.023	0.0051	0.21
60.48	0.023	0.0050	0.21
62.64	0.023	0.0048	0.22

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7.2.1. Peak and Average Power Density, RF Detector Method RFEM0

CHANNEL 1-RFEM0

PEAK POWER DENSITY

Frequency (GHz)	Measurement Distance (m)	Measured Peak Voltage (mV)	Raw Measured Power (dBm)	Measured Power (dBm)	Rx Antenna Gain (dBi)
58.32	3.00	5.39	-30.41	-30.41	23.00
EIRP (dBm)	**EIRP (W)**	**Specification Distance (m)**	**Power Density (W/m^2)**	**Power Density (uW/cm^2)**	**Peak Limit (uW/cm^2)**
23.9	0.245	3.0	0.0022	0.22	18

AVERAGE POWER DENSITY

Frequency (GHz)	Measurement Distance (m)	Measured Average (mV)	Raw Measured Power (dBm)	Measured Power (dBm)	Rx Antenna Gain (dBi)
58.32	3.00	3.43	-30.84	-30.84	23.00
EIRP (dBm)	**EIRP (W)**	**Specification Distance (m)**	**Power Density (W/m^2)**	**Power Density (uW/cm^2)**	**Average Limit (uW/cm^2)**
23.5	0.222	3.0	0.0020	0.20	9

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CHANNEL 2-RFEM0

PEAK POWER DENSITY

Frequency (GHz)	Measurement Distance (m)	Measured Peak Voltage (mV)	Raw Measured Power (dBm)	Measured Power (dBm)	Rx Antenna Gain (dBi)
60.48	3.00	5.89	-28.95	-28.95	23.00
EIRP (dBm)	**EIRP (W)**	**Specification Distance (m)**	**Power Density (W/m^2)**	**Power Density (uW/cm^2)**	**Peak Limit (uW/cm^2)**
25.7	0.368	3.0	0.0033	0.33	18

AVERAGE POWER DENSITY

Frequency (GHz)	Measurement Distance (m)	Measured Average (mV)	Raw Measured Power (dBm)	Measured Power (dBm)	Rx Antenna Gain (dBi)
60.48	3.00	3.83	-29.08	-29.08	23.00
EIRP (dBm)	**EIRP (W)**	**Specification Distance (m)**	**Power Density (W/m^2)**	**Power Density (uW/cm^2)**	**Average Limit (uW/cm^2)**
25.5	0.357	3.0	0.0032	0.32	9

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CHANNEL 3-RFEM0

PEAK POWER DENSITY

Frequency (GHz)	Measurement Distance (m)	Measured Peak Voltage (mV)	Raw Measured Power (dBm)	Measured Power (dBm)	Rx Antenna Gain (dBi)
62.64	3.00	4.38	-30.25	-30.25	23.00
EIRP (dBm)	**EIRP (W)**	**Specification Distance (m)**	**Power Density (W/m^2)**	**Power Density (uW/cm^2)**	**Peak Limit (uW/cm^2)**
24.7	0.293	3.0	0.0026	0.26	18

AVERAGE POWER DENSITY

Frequency (GHz)	Measurement Distance (m)	Measured Average Voltage (mV)	Raw Measured Power (dBm)	Measured Power (dBm)	Rx Antenna Gain (dBi)
62.64	3.00	2.65	-30.41	-30.41	23.00
EIRP (dBm)	**EIRP (W)**	**Specification Distance (m)**	**Power Density (W/m^2)**	**Power Density (uW/cm^2)**	**Average Limit (uW/cm^2)**
24.5	0.282	3.0	0.0025	0.25	9

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7.2.2. Peak and Average Power Density, RF Detector Method RFEM1

CHANNEL 1-RFEM1

PEAK POWER DENSITY

Frequency (GHz)	Measurement Distance (m)	Measured Peak Voltage (mV)	Raw Measured Power (dBm)	Measured Power (dBm)	Rx Antenna Gain (dBi)
58.32	3.00	5.37	-32.01	-32.01	23.00
EIRP (dBm)	**EIRP (W)**	**Specification Distance (m)**	**Power Density (W/m^2)**	**Power Density (uW/cm^2)**	**Peak Limit (uW/cm^2)**
22.3	0.169	3.0	0.0015	0.15	18

AVERAGE POWER DENSITY

Frequency (GHz)	Measurement Distance (m)	Measured Average (mV)	Raw Measured Power (dBm)	Measured Power (dBm)	Rx Antenna Gain (dBi)
58.32	3.00	3.49	-32.17	-32.17	23.00
EIRP (dBm)	**EIRP (W)**	**Specification Distance (m)**	**Power Density (W/m^2)**	**Power Density (uW/cm^2)**	**Average Limit (uW/cm^2)**
22.1	0.163	3.0	0.0014	0.14	9

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CHANNEL 2-RFEM1

PEAK POWER DENSITY

Frequency (GHz)	Measurement Distance (m)	Measured Peak Voltage (mV)	Raw Measured Power (dBm)	Measured Power (dBm)	Rx Antenna Gain (dBi)
60.48	3.00	5.69	-29.53	-29.53	23.00
EIRP (dBm)	**EIRP (W)**	**Specification Distance (m)**	**Power Density (W/m^2)**	**Power Density (uW/cm^2)**	**Peak Limit (uW/cm^2)**
25.1	0.322	3.0	0.0029	0.29	18

AVERAGE POWER DENSITY

Frequency (GHz)	Measurement Distance (m)	Measured Average (mV)	Measured Power (dBm)	Measured Power (dBm)	Rx Antenna Gain (dBi)
60.48	3.00	3.77	-30.31	-30.31	23.00
EIRP (dBm)	**EIRP (W)**	**Specification Distance (m)**	**Power Density (W/m^2)**	**Power Density (uW/cm^2)**	**Average Limit (uW/cm^2)**
24.3	0.269	3.0	0.0024	0.24	9

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CHANNEL 3-RFEM1

PEAK POWER DENSITY

Frequency (GHz)	Measurement Distance (m)	Measured Peak Voltage (mV)	Raw Measured Power (dBm)	Measured Power (dBm)	Rx Antenna Gain (dBi)
62.64	3.00	4.21	-30.89	-30.89	23.00
EIRP (dBm)	**EIRP (W)**	**Specification Distance (m)**	**Power Density (W/m^2)**	**Power Density (uW/cm^2)**	**Peak Limit (uW/cm^2)**
24.0	0.253	3.0	0.0022	0.22	18

AVERAGE POWER DENSITY

Frequency (GHz)	Measurement Distance (m)	Measured Average Voltage (mV)	Measured Power (dBm)	Measured Power (dBm)	Rx Antenna Gain (dBi)
62.64	3.00	2.69	-31.01	-31.01	23.00
EIRP (dBm)	**EIRP (W)**	**Specification Distance (m)**	**Power Density (W/m^2)**	**Power Density (uW/cm^2)**	**Average Limit (uW/cm^2)**
23.9	0.246	3.0	0.0022	0.22	9

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7.3. PEAK OUTPUT POWER

LIMIT

§15.255 (e) Except as specified paragraph (e)(1) of this section, the peak transmitter conducted output power shall not exceed 500 mW. Depending on the gain of the antenna, it may be necessary to operate the intentional radiator using a lower peak transmitter output power in order to comply with the EIRP limits specified in paragraph (b) of this section.

§15.255 (e) (1) Transmitters with an emission bandwidth of less than 100 MHz must limit their peak transmitter conducted output power to the product of 500 mW times their emission bandwidth divided by 100 MHz. For the purposes of this paragraph, emission bandwidth is defined as the instantaneous frequency range occupied by a steady state radiated signal with modulation, outside which the radiated power spectral density never exceeds 6 dB below the maximum radiated power spectral density in the band, as measured with a 100 kHz resolution bandwidth spectrum analyzer. The center frequency must be stationary during the measurement interval, even if not stationary during normal operation (e.g., for frequency hopping devices).

PROCEDURE

The maximum EUT antenna gain is subtracted from the Peak EIRP.

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RESULTS

RFEM 0

PEAK OUTPUT POWER-RF Det. Method

Frequency (GHz)	EIRP (dBm)	EUT Antenna Gain (dBi)	Output Power (dBm)	Output Power (mW)	6 dB Bandwidth (MHz)	Output Power Limit (mW)
58.32	23.9	15.45	8.45	7.0	1310	500
60.48	25.7	15.45	10.25	10.6	1240	500
62.64	24.7	15.45	9.25	8.4	1310	500

RFEM1

PEAK OUTPUT POWER-RF Det. Method

Frequency (GHz)	EIRP (dBm)	EUT Antenna Gain (dBi)	Output Power (dBm)	Output Power (mW)	6 dB Bandwidth (MHz)	Output Power Limit (mW)
58.32	22.3	15.45	6.85	4.8	1320	500
60.48	25.1	15.45	9.65	9.2	1170	500
62.64	24.0	15.45	8.55	7.2	1185	500

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7.4. PEAK AND AVERAGE RADIATED OUTPUT POWER

For information purposes.

RESULTS

RFEM0

PEAK RADIATED POWER

Frequency (GHz)	Channel	Output Power (dBm) EIRP	Output Power (mW) EIRP
58.32	1	23.90	245.47
60.48	2	25.70	371.54
62.64	3	24.70	295.12

AVERAGE RADIATED POWER

Frequency (GHz)	Channel	Output Power (dBm) EIRP	Output Power (mW) EIRP
58.32	1	23.50	223.87
60.48	2	25.50	354.81
62.64	3	24.50	281.84

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RFEM1

PEAK RADIATED POWER

Frequency (GHz)	Channel	Output Power (dBm) EIRP	Output Power (mW) EIRP
58.32	1	22.30	169.82
60.48	2	25.10	323.59
62.64	3	24.00	251.19

AVERAGE RADIATED POWER

Frequency (GHz)	Channel	Output Power (dBm) EIRP	Output Power (mW) EIRP
58.32	1	22.10	162.18
60.48	2	24.30	269.15
62.64	3	23.90	245.47

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7.5. FREQUENCY STABILITY

LIMIT

§15.255 (f) Fundamental emissions must be contained within the frequency bands specified in this section during all conditions of operation. Equipment is presumed to operate over the temperature range - 20 to +50 degrees celsius with an input voltage variation of 85% to 115% of rated input voltage, unless justification is presented to demonstrate otherwise.

Manufacturers Specification is 3.3VDC +/- 5%.

TEST PROCEDURE

The radio module is placed in an environmental chamber, with power furnished by an adjustable source. The carrier frequency is counted at each condition and compared with the reference condition.

RESULTS

RFEM 0

Reference Conditions: 3.3VDC @ 20ºC		RFEM0	CHANNEL 2
Power Supply (VDC)	**Environment Temperature (ºC)**	**Frequency (MHz)**	**Delta (kHz)**
3.30	50	60479.2131720	-465.586
3.30	40	60479.2732550	-405.503
3.30	30	60479.4392750	-239.483
3.30	***20***	***60479.6787580***	***Reference***
3.30	10	60479.9136080	234.850
3.30	0	60480.1559270	477.169
3.30	-10	60480.3579250	679.167
3.30	-20	60480.4719100	793.152
3.135	20	60479.6804910	1.733
3.465	20	60479.6727370	-6.021

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RFEM 1

Reference Conditions: 3.3VDC @ 20ºC		RFEM1	CHANNEL 2
Power Supply (VDC)	**Environment Temperature (ºC)**	**Frequency (MHz)**	**Delta (kHz)**
3.30	50	60479.2140380	-462.500
3.30	40	60479.2727700	-403.768
3.30	30	60479.4386650	-237.873
3.30	***20***	***60479.6765380***	***Reference***
3.30	10	60479.9110260	234.488
3.30	0	60480.1541260	477.588
3.30	-10	60480.3571930	680.655
3.30	-20	60480.4734510	796.913
3.135	20	60479.6806630	4.125
3.465	20	60479.6730250	-3.513

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7.6. TX SPURIOUS EMISSIONS

LIMITS

§15.255 (c) (1) The power density of any emissions outside the 57–64 GHz band shall consist solely of spurious emissions.

§15.255 (c) (2) Radiated emissions below 40 GHz shall not exceed the general limits in §15.209.

§15.255 (c) (3) Between 40 GHz and 200 GHz, the level of these emissions shall not exceed 90 pW/cm^2 at a distance of 3 meters.

§15.255 (c) (4) The levels of the spurious emissions shall not exceed the level of the fundamental emission.

§15.255 (d) Only spurious emissions and transmissions related to a publicly accessible coordination channel, whose purpose is to coordinate operation between diverse transmitters with a view towards reducing the probability of interference throughout the 57–64 GHz band, are permitted in the 57–57.05 GHz band.

Note to paragraph (d): The 57–57.05 GHz is reserved exclusively for a publicly-accessible coordination channel. The development of standards for this channel shall be performed pursuant to authorizations issued under part 5 of this chapter.

PROCEDURE FOR 30 MHz TO 40 GHz

ANSI C 63.10-2009

PROCEDURE FOR 40 TO 200 GHz

KDB200443 millimeter wave test procedure.

External harmonic mixers are utilized. The EIRP is measured, then the power density at a 3 meter distance is calculated.

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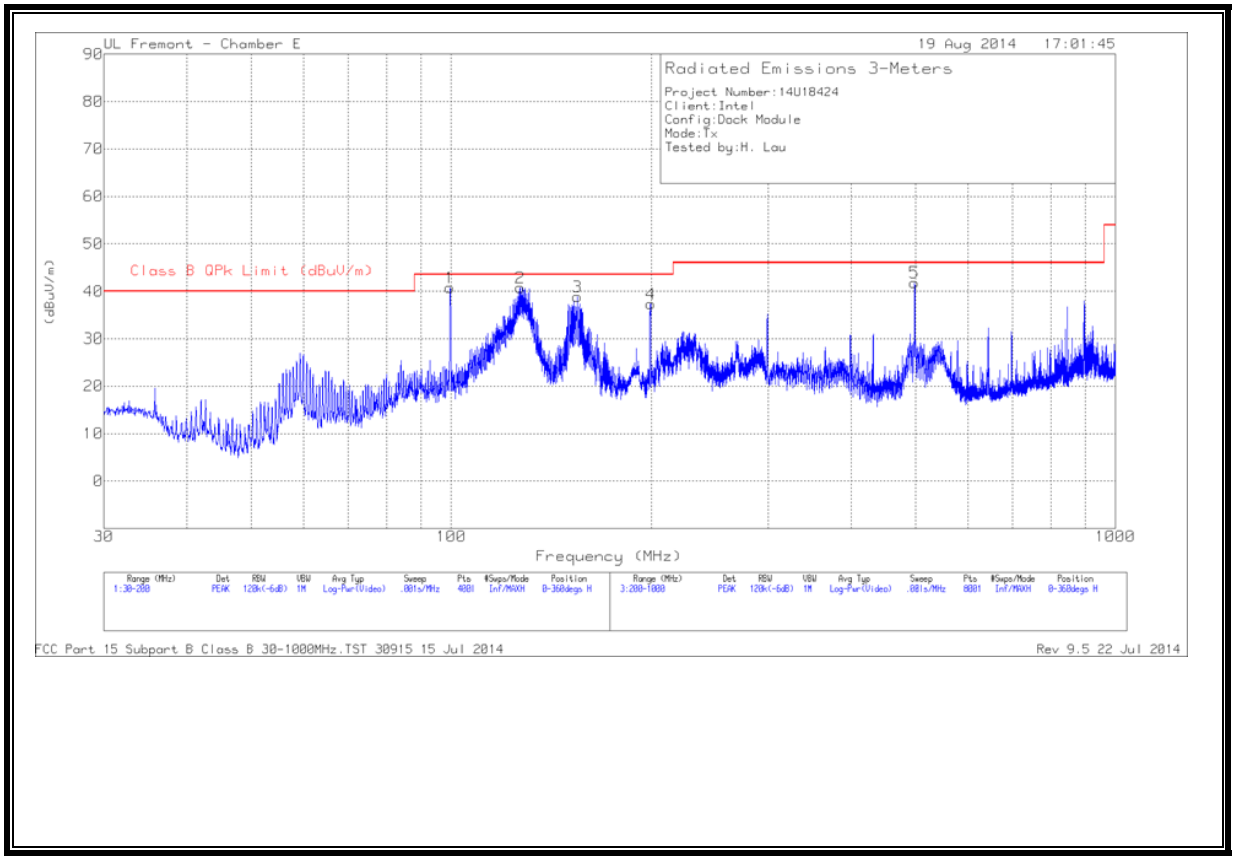
7.6.1. Spurious Emissions 30MHz TO 1 GHz- RFEM0

TX SPURIOUS EMISSION 30 TO 1000 MHz (HORIZONTAL PLOT)



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TX SPURIOUS EMISSION 30 TO 1000 MHz (VERTICAL PLOT)

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TX SPURIOUS EMISSION 30MHz-1GHz

Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Hybrid	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	Class B QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
6	59.8775	58.4	PK	7.5	-31.6	34.3	40	-5.7	0-360	100	V
1	99.5725	62.14	PK	10	-31.3	40.84	43.52	-2.68	0-360	301	H
7	99.7425	62.12	PK	10	-31.4	40.72	43.52	-2.8	0-360	100	V
2	127.0063	58.17	PK	13.8	-31.2	40.77	43.52	-2.75	0-360	201	H
3	154.8225	57.53	PK	12.3	-31	38.83	43.52	-4.69	0-360	201	H
4	199.5538	55.77	PK	12.4	-30.8	37.37	43.52	-6.15	0-360	101	H
8	199.575	54.24	PK	12.4	-30.8	35.84	43.52	-7.68	0-360	100	V
5	497.9	54.06	PK	17.4	-29.6	41.86	46.02	-4.16	0-360	100	H
9	846	48.98	PK	21.7	-28.6	42.08	46.02	-3.94	0-360	301	V

PK - Peak detector

Radiated Emissions

Marker	Freq. (MHz)	Meter Reading (dBuV)	Det	Hybrid	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	Class B QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Pol.
6	59.36	57.52	QP	7.4	-31.7	33.22	40	-6.78	326	110	V
1	99.58	60.89	QP	10	-31.3	39.59	43.52	-3.93	154	291	H
7	99.77	61.12	QP	10	-31.4	39.72	43.52	-3.8	136	104	V
2	127.94	56.62	QP	13.7	-31.1	39.22	43.52	-4.3	161	212	H
3	154.59	56.72	QP	12.3	-31.1	37.92	43.52	-5.6	291	166	H
4	199.53	55.19	QP	12.4	-30.8	36.79	43.52	-6.73	271	129	H
8	199.54	53.48	QP	12.4	-30.8	35.08	43.52	-8.44	259	100	V
5	497.88	52.84	QP	17.4	-29.6	40.64	46.02	-5.38	184	101	H
9	844.13	33.88	QP	21.7	-28.5	27.08	46.02	-18.94	199	105	V

QP - Quasi-Peak detector

FCC Part 15 Subpart B Class B 30-1000MHz.TST 30915 15 Jul 2014

Rev 9.5 22 Jul 2014

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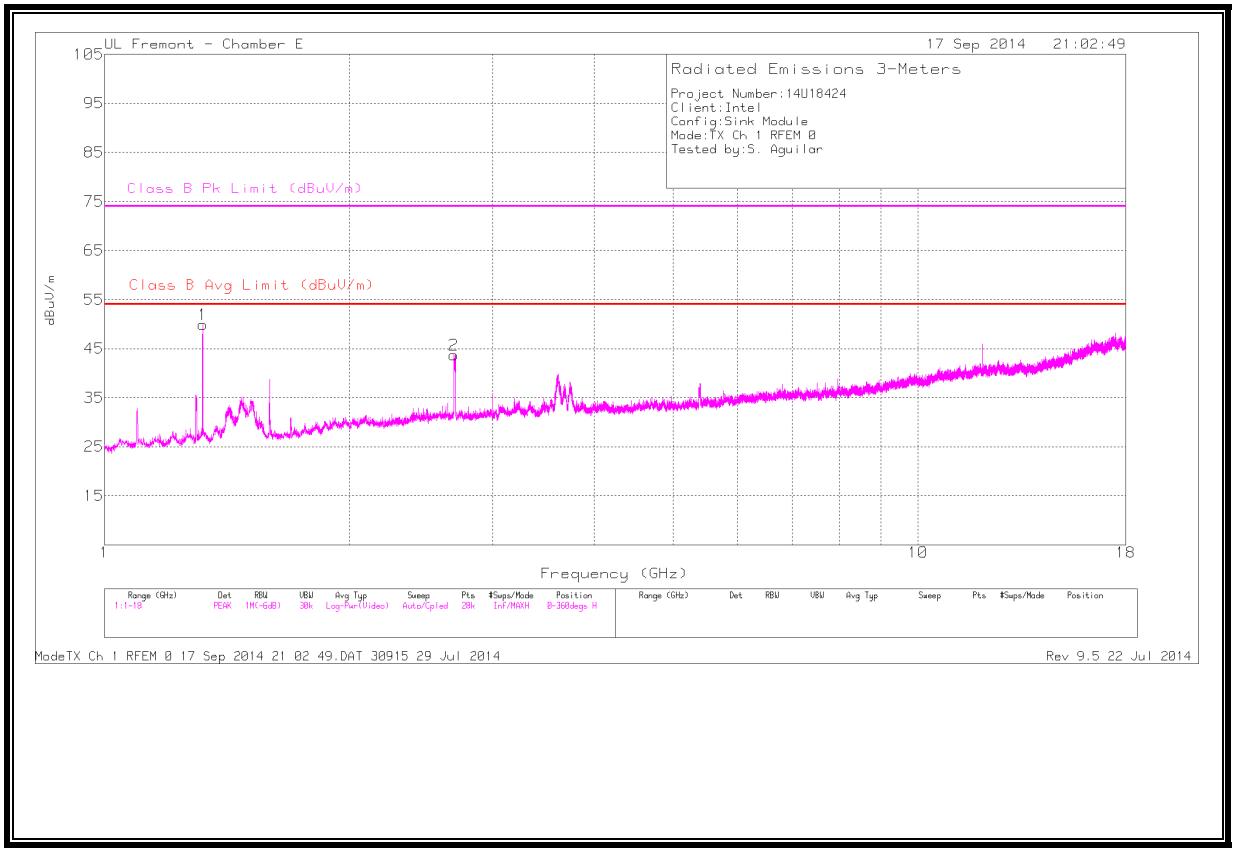
7.6.2. Spurious Emissions 1 TO 18 GHz- RFEM0

CHANNEL 1 - TX SPURIOUS EMISSION 1-18 GHz (HORIZONTAL PLOT)



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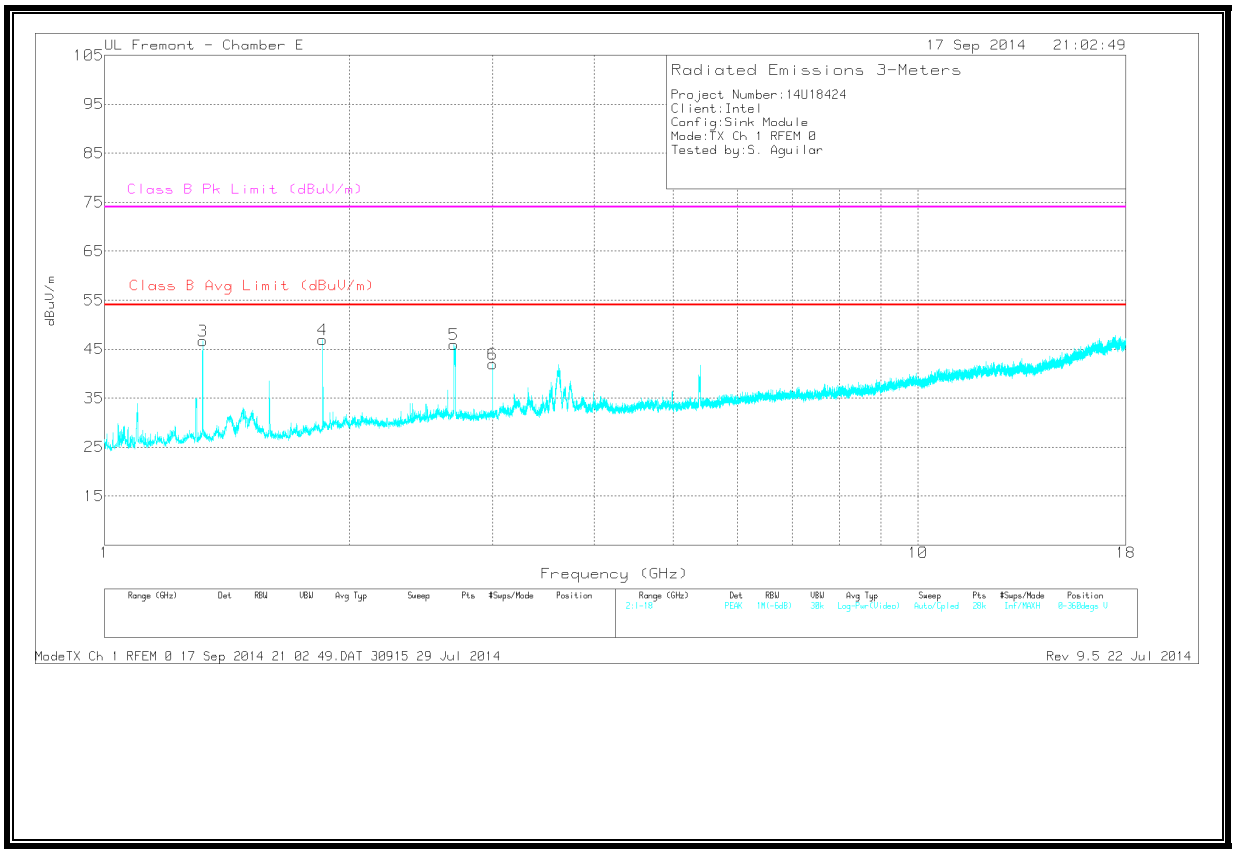
CHANNEL 1 – TX SPURIOUS EMISSION 1-18 GHz (VERTICAL PLOT)



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CHANNEL 1 TX SPURIOUS EMISSION 1-18 GHz

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (dB/m)	Amp/Cbl (dB)	Corrected Reading dBuV/m	Class B Avg Limit (dBuV/m)	Av(CISPR) Margin (dB)	Class B Pk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	1.32	55.47	PK	29	-34.6	49.87	-	-	74	-24.13	0-360	200	H
3	1.32	52.3	PK	29	-34.6	46.7	-	-	74	-27.3	0-360	200	V
4	1.854	50.36	PK	30.6	-34	46.96	-	-	74	-27.04	0-360	200	V
2	2.688	44.19	PK	32.5	-33	43.69	-	-	74	-30.31	0-360	200	H
5	2.689	46.49	PK	32.5	-33	45.99	-	-	74	-28.01	0-360	100	V
6	3	41.9	PK	32.8	-32.7	42	-	-	74	-32	0-360	200	V

PK - Peak detector

Radiated Emissions

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (dB/m)	Amp/ Cbl (dB)	Corrected Reading dBuV/m	Class B Avg Limit (dBuV/m)	Av(CISPR) Margin (dB)	Class B Pk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Pol.
1	1.32	56.42	PK	29	-34.6	50.82	-	-	74	-23.18	332	201	H
1	1.32	55.38	Avg	29	-34.6	49.78	54	-4.22	-	-	332	201	H
3	1.32	54.32	PK	29	-34.6	48.72	-	-	74	-25.28	75	200	V
3	1.32	52.46	Avg	29	-34.6	46.86	54	-7.14	-	-	75	200	V
4	1.862	42.45	PK	30.7	-33.9	39.25	-	-	74	-34.75	305	362	V
4	1.864	29.7	Avg	30.7	-33.9	26.5	54	-27.5	-	-	305	362	V
2	2.688	58.6	PK	32.5	-33	58.1	-	-	74	-15.9	325	335	H
2	2.688	38.65	Avg	32.5	-33	38.15	54	-15.85	-	-	325	335	H
5	2.688	63.2	PK	32.5	-33	62.7	-	-	74	-11.3	214	393	V
5	2.688	41.92	Avg	32.5	-33	41.42	54	-12.58	-	-	214	393	V
6	3	43.13	PK	32.8	-32.7	43.23	-	-	74	-30.77	213	201	V
6	3	35.85	Avg	32.8	-32.7	35.95	54	-18.05	-	-	213	201	V

PK - Peak detector

Avg - Video bandwidth < Resolution bandwidth

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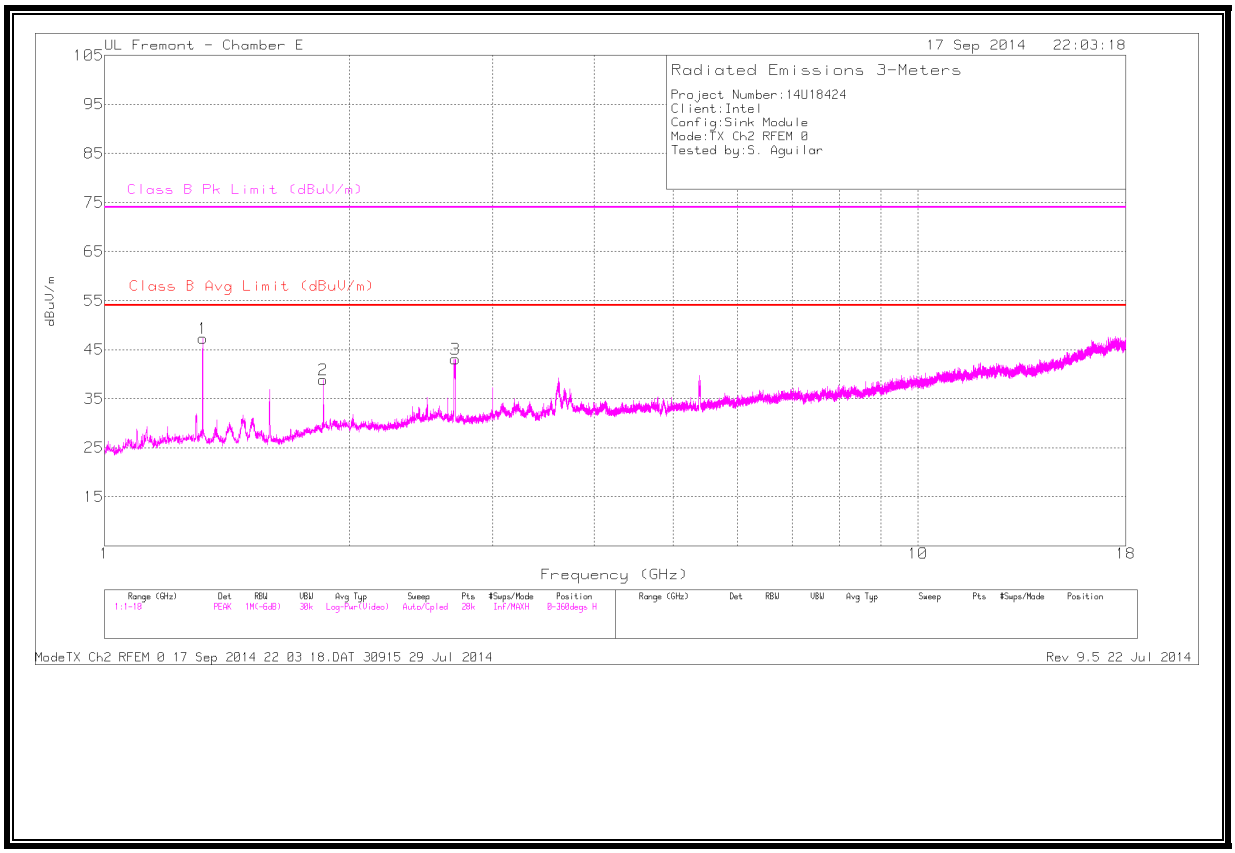
CHANNEL 2 - TX SPURIOUS EMISSION 1-18 GHz (HORIZONTAL PLOT)



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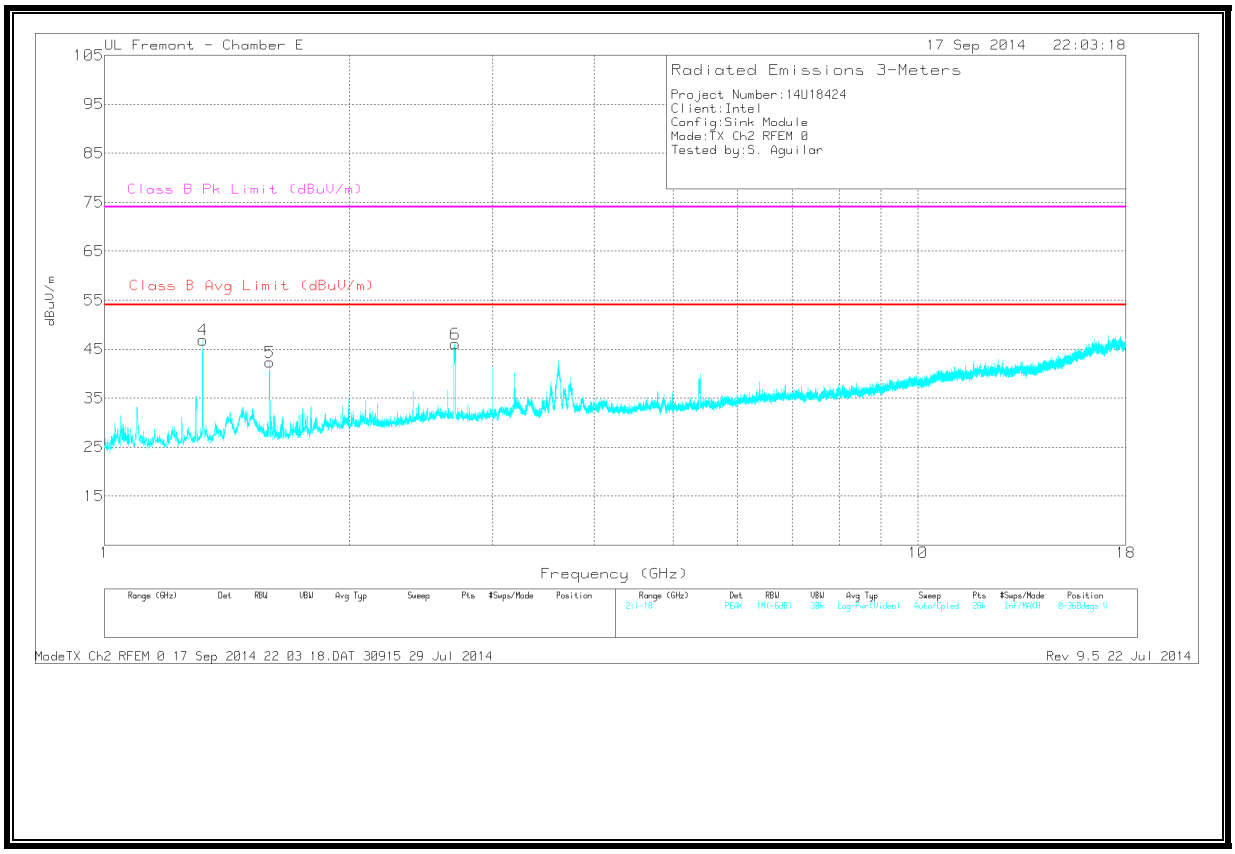
CHANNEL 2 – TX SPURIOUS EMISSION 1-18 GHz (VERTICAL PLOT)



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CHANNEL 2 TX SPURIOUS EMISSION 1-18 GHz

Trace Markers

Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (dB/m)	Amp/Cbl (dB)	Corrected Reading dBuV/m	Class B Avg Limit (dBuV/m)	Av(CISPR) Margin (dB)	Class B Pk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	1.32	52.86	PK	29	-34.6	47.26	-	-	74	-26.74	0-360	262	H
4	1.32	52.47	PK	29	-34.6	46.87	-	-	74	-27.13	0-360	201	V
5	1.596	48.02	PK	28.4	-34.1	42.32	-	-	74	-31.68	0-360	201	V
2	1.857	42.07	PK	30.7	-33.9	38.87	-	-	74	-35.13	0-360	262	H
3	2.699	43.34	PK	32.5	-32.8	43.04	-	-	74	-30.96	0-360	262	H
6	2.699	46.36	PK	32.5	-32.8	46.06	-	-	74	-27.94	0-360	101	V

PK - Peak detector

Radiated Emissions

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (dB/m)	Amp/ Cbl (dB)	Corrected Reading dBuV/m	Class B Avg Limit (dBuV/m)	Av(CISPR) Margin (dB)	Class B Pk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Pol.
1	1.32	55.1	PK	29	-34.6	49.5	-	-	74	-24.5	226	104	H
1	1.32	53.57	Avg	29	-34.6	47.97	54	-6.03	-	-	226	104	H
4	1.32	54.05	PK	29	-34.6	48.45	-	-	74	-25.55	75	201	V
4	1.32	52.39	Avg	29	-34.6	46.79	54	-7.21	-	-	75	201	V
5	1.595	61.16	PK	28.4	-34.1	55.46	-	-	74	-18.54	150	251	V
5	1.595	35.12	Avg	28.4	-34.1	29.42	54	-24.58	-	-	150	251	V
2	1.857	43.23	PK	30.7	-33.9	40.03	-	-	74	-33.97	158	215	H
2	1.857	28.79	Avg	30.7	-33.9	25.59	54	-28.41	-	-	158	215	H
3	2.699	61.39	PK	32.5	-32.8	61.09	-	-	74	-12.91	211	314	H
3	2.699	42.43	Avg	32.5	-32.8	42.13	54	-11.87	-	-	211	314	H
6	2.7	63.55	PK	32.5	-32.8	63.25	-	-	74	-10.75	278	327	V
6	2.7	42.81	Avg	32.5	-32.8	42.51	54	-11.49	-	-	278	327	V

PK - Peak detector

Avg - Video bandwidth < Resolution bandwidth

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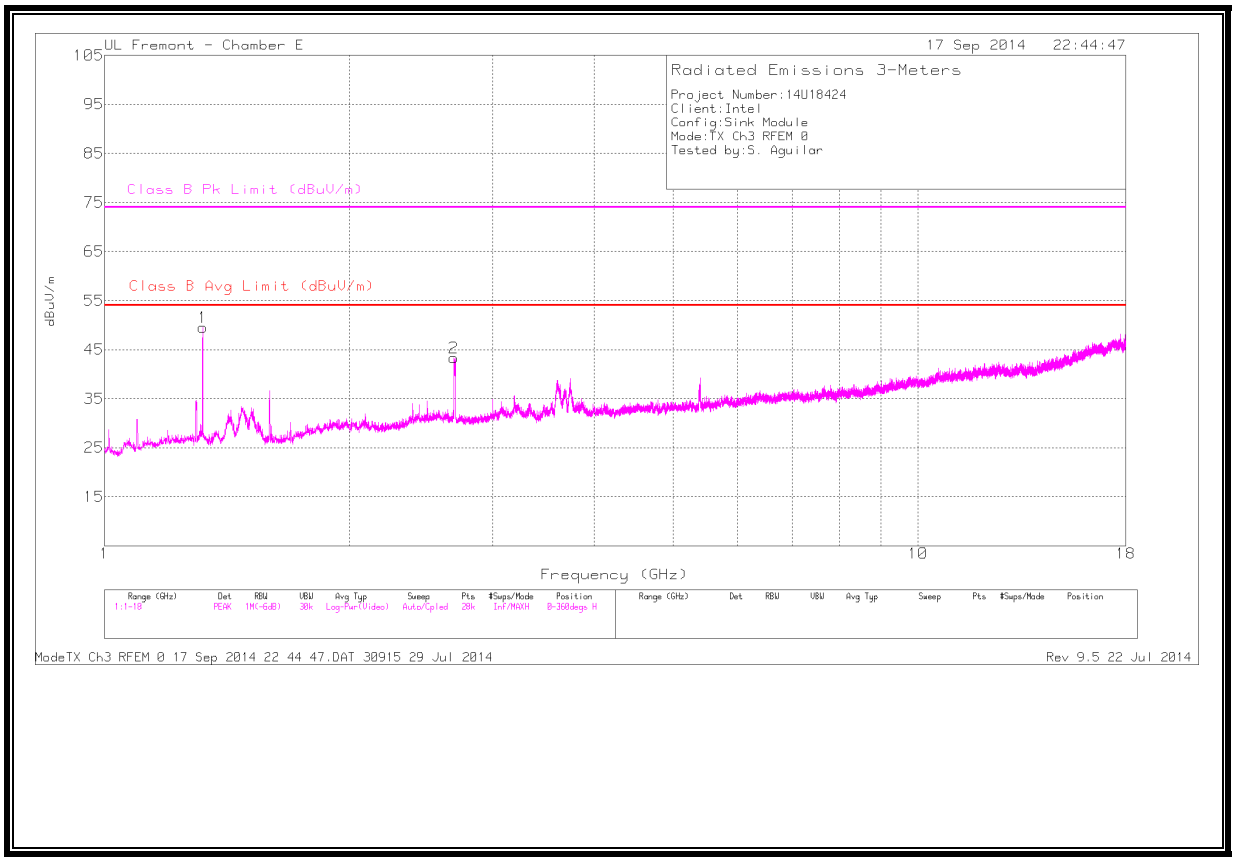
CHANNEL 3 - TX SPURIOUS EMISSION 1-18 GHz (HORIZONTAL PLOT)



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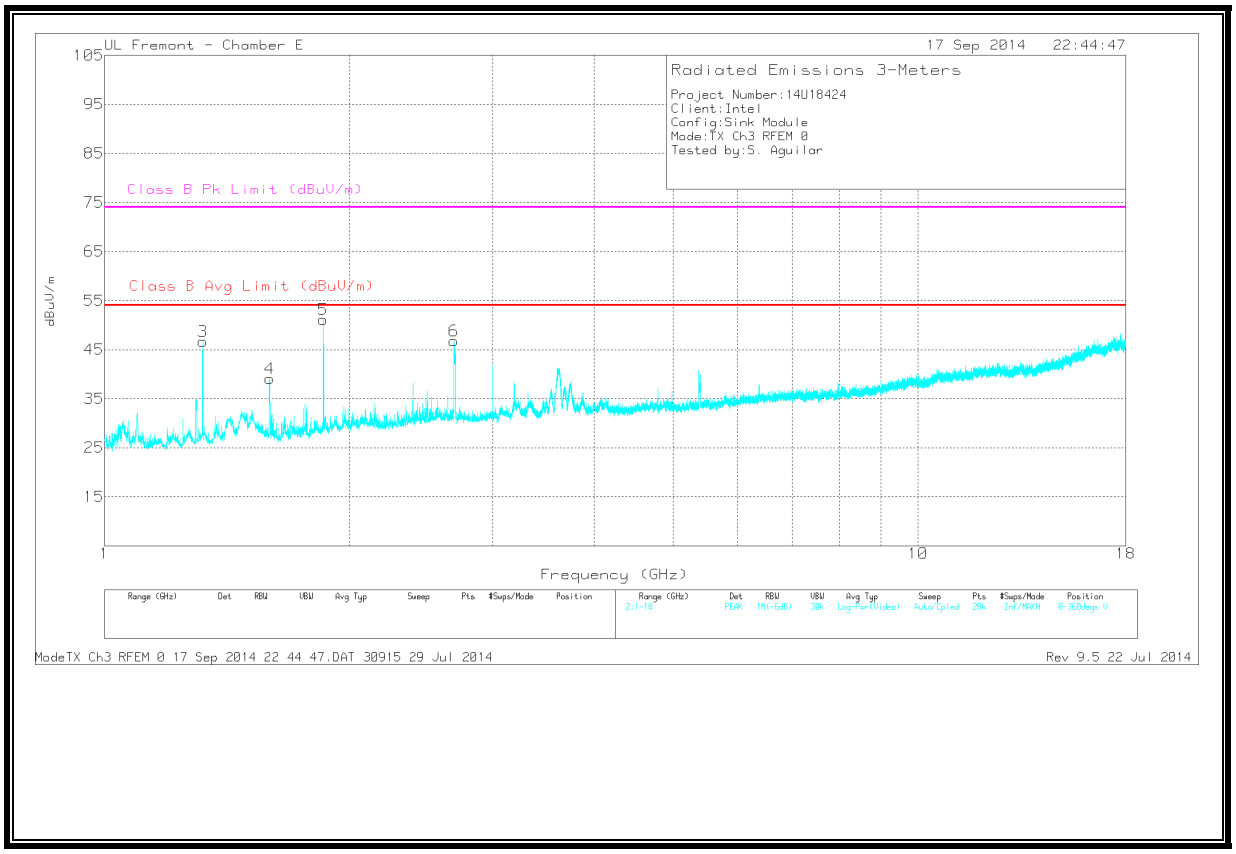
CHANNEL 3 – TX SPURIOUS EMISSION 1-18 GHz (VERTICAL PLOT)



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CHANNEL 3TX SPURIOUS EMISSION 1-18 GHz

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (dB/m)	Amp/Cbl (dB)	Corrected Reading dBuV/m	Class B Avg Limit (dBuV/m)	Av(CISPR) Margin (dB)	Class B Pk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	1.32	55.11	PK	29	-34.6	49.51	-	-	74	-24.49	0-360	201	H
3	1.32	52.25	PK	29	-34.6	46.65	-	-	74	-27.35	0-360	200	V
4	1.596	44.76	PK	28.4	-34.1	39.06	-	-	74	-34.94	0-360	200	V
5	1.857	54.31	PK	30.7	-33.9	51.11	-	-	74	-22.89	0-360	200	V
2	2.688	43.86	PK	32.5	-33	43.36	-	-	74	-30.64	0-360	201	H
6	2.689	47.3	PK	32.5	-33	46.8	-	-	74	-27.2	0-360	101	V

PK - Peak detector

Radiated Emissions

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (dB/m)	Amp/ Cbl (dB)	Corrected Reading dBuV/m	Class B Avg Limit (dBuV/m)	Av(CISPR) Margin (dB)	Class B Pk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	PoL.
1	1.32	56.38	PK	29	-34.6	50.78	-	-	74	-23.22	323	199	H
1	1.32	55.33	Avg	29	-34.6	49.73	54	-4.27	-	-	323	199	H
3	1.32	54.31	PK	29	-34.6	48.71	-	-	74	-25.29	78	194	V
3	1.32	52.47	Avg	29	-34.6	46.87	54	-7.13	-	-	78	194	V
4	1.595	58.21	PK	28.4	-34.1	52.51	-	-	74	-21.49	177	106	V
4	1.595	32.57	Avg	28.4	-34.1	26.87	54	-27.13	-	-	177	106	V
5	1.857	42.67	PK	30.7	-33.9	39.47	-	-	74	-34.53	173	323	V
5	1.857	29.06	Avg	30.7	-33.9	25.86	54	-28.14	-	-	173	323	V
2	2.688	59.23	PK	32.5	-33	58.73	-	-	74	-15.27	309	197	H
2	2.688	39.33	Avg	32.5	-33	38.83	54	-15.17	-	-	309	197	H
6	2.688	63.5	PK	32.5	-33	63	-	-	74	-11	201	101	V
6	2.693	44.56	Avg	32.5	-32.9	44.16	54	-0.84	-	-	201	101	V

PK - Peak detector

Avg - Video bandwidth < Resolution bandwidth

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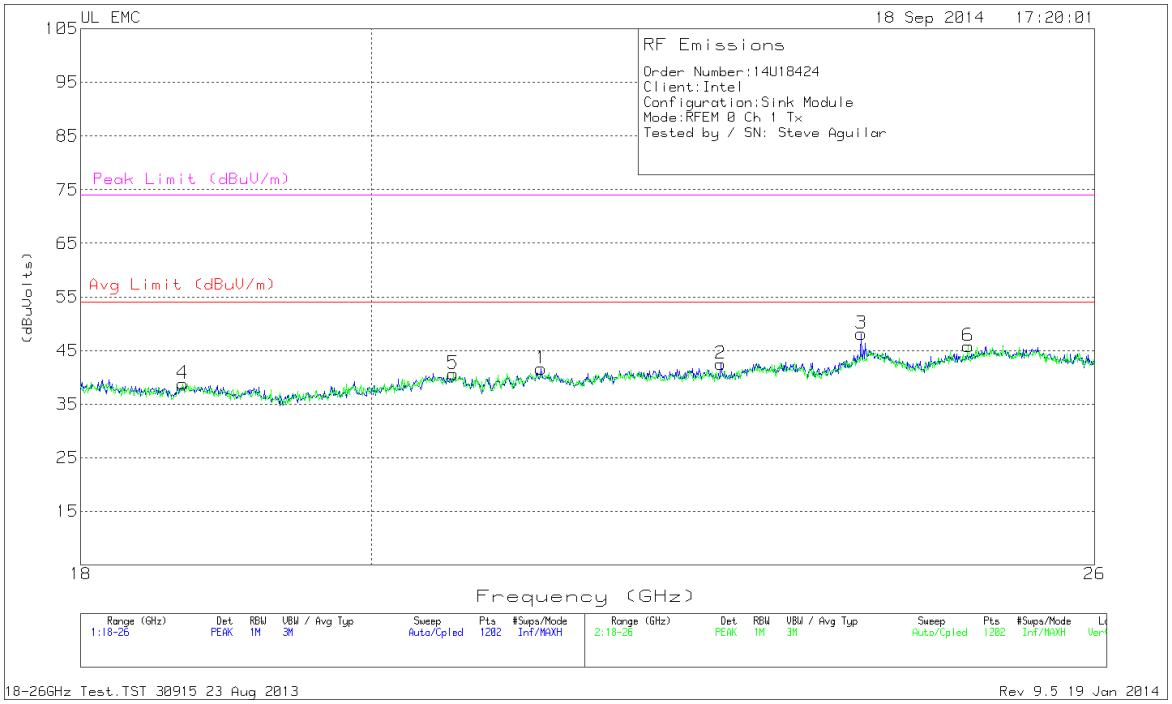
7.6.3. Spurious Emissions 18 to 26 GHz- RFEM0

CHANNEL 1 - TX SPURIOUS EMISSION 18 TO 26 GHz (HORIZONTAL AND VERTICAL PLOT)



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CHANNEL 1 -TX SPURIOUS EMISSION 18 TO 26 GHz

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T89 (dB/m)	Amp/Cbl (dB)	Dist Corr (dB)	Corrected Reading (dBuVolts)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)
1	21.271	42.07	PK	33	-23.9	-9.5	41.66	54	-12.33	74	-32.33
2	22.703	42	PK	33.4	-23.4	-9.5	42.5	54	-11.5	74	-31.5
3	23.888	46.77	PK	33.6	-22.7	-9.5	48.16	54	-5.83	74	-25.83
4	18.679	40.03	PK	32.5	-24.2	-9.5	38.83	54	-15.16	74	-35.16
5	20.604	41.17	PK	32.9	-23.9	-9.5	40.66	54	-13.33	74	-33.33
6	24.834	44.03	PK	34	-22.7	-9.5	45.83	54	-8.16	74	-28.16

PK - Peak detector

18-26GHz Test.TST 30915 23 Aug 2013 Rev 9.5 19 Jan 2014

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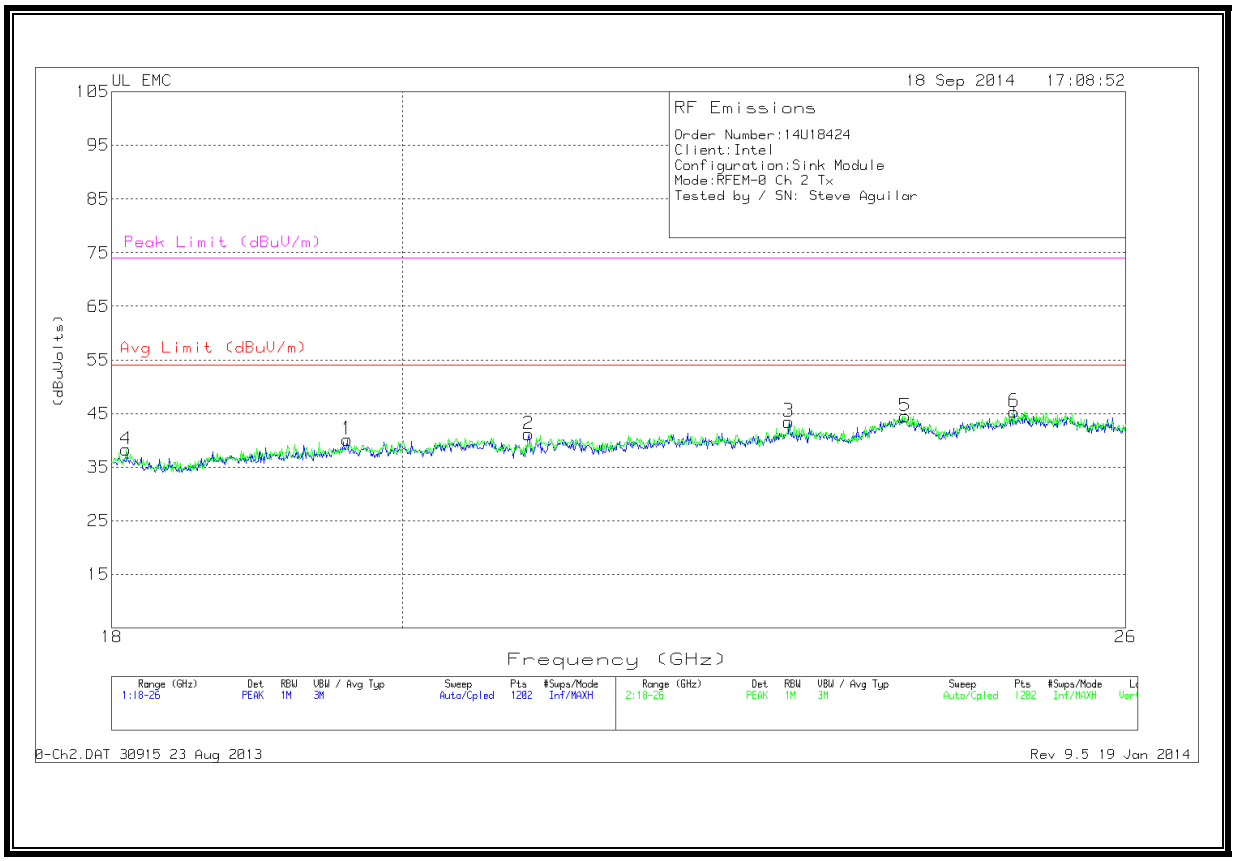
CHANNEL 2 - TX SPURIOUS EMISSION 18 TO 26 GHz (HORIZONTAL AND VERTICAL PLOT)



Measurement distance is 1 m

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CHANNEL 2 -TX SPURIOUS EMISSION 18 TO 26 GHz

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T89 (dB/m)	Amp/Cbl (dB)	Dist Corr (dB)	Corrected Reading (dBuVolts)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)
1	19.605	40.97	PK	32.6	-23.9	-9.5	40.16	54	-13.83	74	-33.83
2	20.938	42.07	PK	32.9	-24.3	-9.5	41.16	54	-12.83	74	-32.83
3	23.009	42.7	PK	33.6	-23.3	-9.5	43.5	54	-10.5	74	-30.5
4	18.093	40.33	PK	32.4	-24.9	-9.5	38.33	54	-15.66	74	-35.66
5	24.002	43.1	PK	33.6	-22.7	-9.5	44.5	54	-9.5	74	-29.50
6	24.968	43.73	PK	34	-22.9	-9.5	45.33	54	-8.66	74	-28.66

PK - Peak detector

0-Ch2.DAT 30915 23 Aug 2013 Rev 9.5 19 Jan 2014

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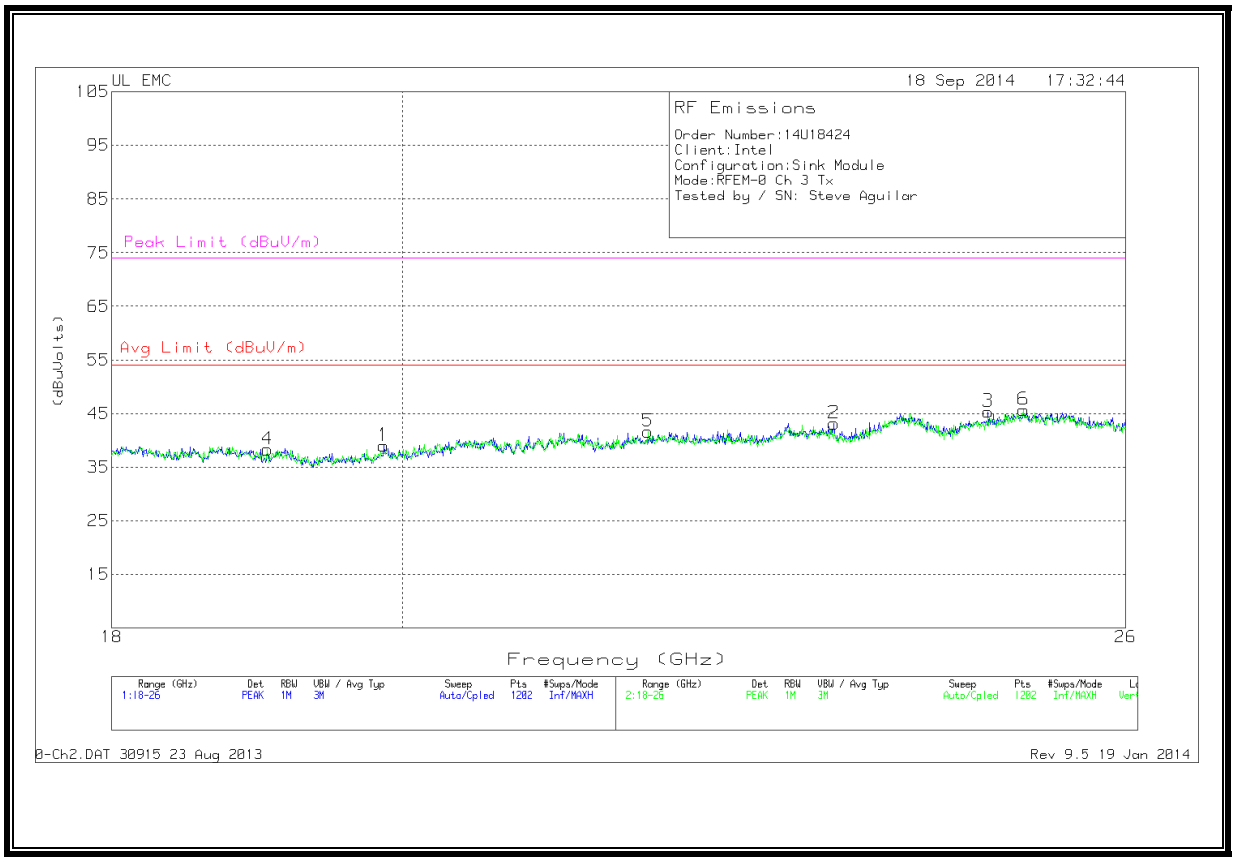
CHANNEL 3 - TX SPURIOUS EMISSION 18 TO 26 GHz (HORIZONTAL AND VERTICAL PLOT)



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CHANNEL 3 -TX SPURIOUS EMISSION 18 TO 26 GHz

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T89 (dB/m)	Amp/Cbl (dB)	Dist Corr (dB)	Corrected Reading (dBuVolts)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)
1	19.865	39.5	PK	32.8	-23.8	-9.5	39	54	-15	74	-35
2	23.389	41.87	PK	33.4	-22.6	-9.5	43.16	54	-10.83	74	-30.83
3	24.734	43.63	PK	34	-22.8	-9.5	45.33	54	-8.66	74	-28.66
4	19.046	39.53	PK	32.5	-24.2	-9.5	38.33	54	-15.66	74	-35.66
5	21.863	41.57	PK	33.3	-23.7	-9.5	41.66	54	-12.33	74	-32.33
6	25.054	43.77	PK	34	-22.6	-9.5	45.66	54	-8.33	74	-28.33

PK - Peak detector

0-Ch2.DAT 30915 23 Aug 2013 Rev 9.5 19 Jan 2014

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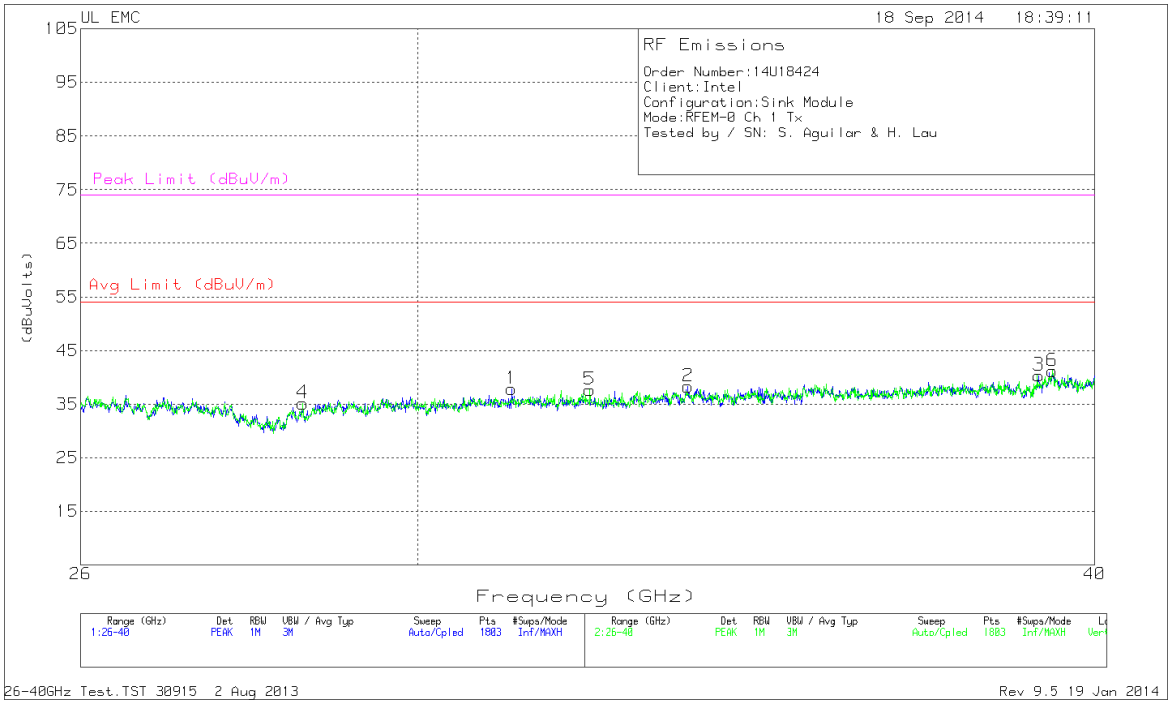
7.6.4. Spurious Emissions 26 TO 40 GHz- RFEM0

CHANNEL 1 - TX SPURIOUS EMISSION 26 TO 40 GHz (HORIZONTAL AND VERTICAL PLOT)



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CHANNEL 1 -TX SPURIOUS EMISSION 26 TO 40 GHz

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	T90 AF (dB/m)	Amp/Cbl (dB)	Dist Corr (dB)	Corrected Reading (dBuVolts)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)
1	31.221	48.43	PK	36	-37.1	-9.5	37.83	54	-16.16	74	-36.16
2	33.653	47.83	PK	36.9	-36.9	-9.5	38.33	54	-15.66	74	-35.66
3	39.06	49.83	PK	37.6	-37.6	-9.5	40.33	54	-13.66	74	-33.6
4	28.572	44.87	PK	35.7	-35.9	-9.5	35.16	54	-18.83	74	-38.83
5	32.277	47.97	PK	36.4	-37.2	-9.5	37.66	54	-16.33	74	-36.33
6	39.285	48.37	PK	38.4	-36.1	-9.5	41.16	54	-12.83	74	-32.83

PK - Peak detector

26-40GHz Test.TST 30915 2 Aug 2013 Rev 9.5 19 Jan 2014

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CHANNEL 2 - TX SPURIOUS EMISSION 26 TO 40 GHz (HORIZONTAL AND VERTICAL PLOT)

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CHANNEL 2 -TX SPURIOUS EMISSION 26 TO 40 GHz

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	T90 AF (dB/m)	Amp/Cbl (dB)	Dist Corr (dB)	Corrected Reading (dBuVolts)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)
1	30.964	48.3	PK	35.9	-37.2	-9.5	37.5	54	-16.5	74	-36.5
2	33.637	48.07	PK	36.9	-36.8	-9.5	38.66	54	-15.33	74	-35.33
3	34.577	48.67	PK	37.4	-37.9	-9.5	38.66	54	-15.33	74	-35.33
4	27.266	44.6	PK	35.6	-34.2	-9.5	36.5	54	-17.5	74	-37.5
5	35.012	49.03	PK	37.2	-38.4	-9.5	38.33	54	-15.66	74	-35.66
6	39.239	49.67	PK	38.5	-37.5	-9.5	41.16	54	-12.83	74	-32.83

PK - Peak detector

*.TST 30915 2 Aug 2013 Rev 9.5 19 Jan 2014

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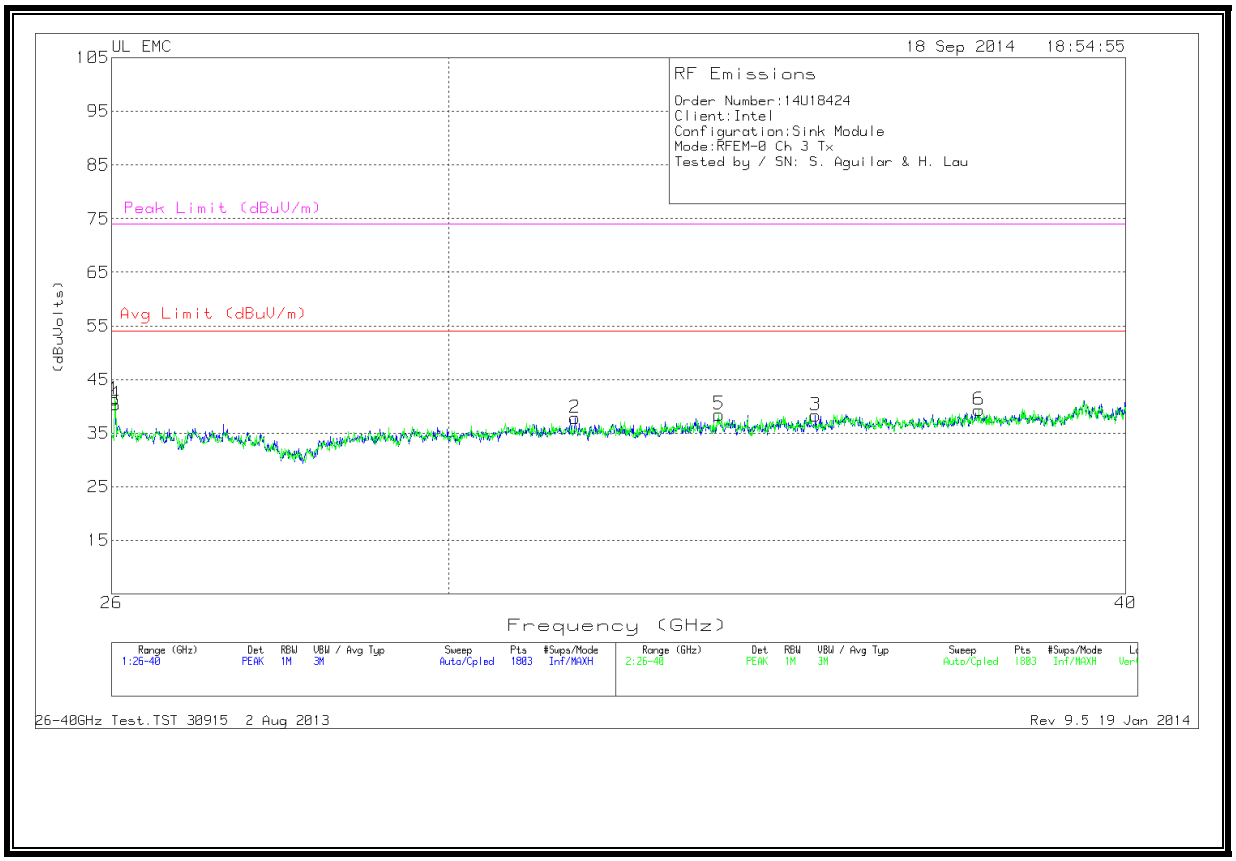
CHANNEL 3 - TX SPURIOUS EMISSION 26 TO 40 GHz (HORIZONTAL AND VERTICAL PLOT)



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CHANNEL 3 -TX SPURIOUS EMISSION 26 TO 40 GHz

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	T90 AF (dB/m)	Amp/Cbl (dB)	Dist Corr (dB)	Corrected Reading (dBuVolts)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)
1	26.031	49.33	PK	35.6	-34.1	-9.5	41.33	54	-12.66	74	-32.66
2	31.656	48.13	PK	36.3	-37.1	-9.5	37.83	54	-16.16	74	-36.16
3	35.059	49.23	PK	37.3	-38.7	-9.5	38.33	54	-15.66	74	-35.66
4	26.039	48.23	PK	35.6	-34	-9.5	40.33	54	-13.66	74	-33.66
5	33.653	48	PK	36.9	-36.9	-9.5	38.5	54	-15.5	74	-35.5
6	37.584	50.63	PK	37.2	-39	-9.5	39.33	54	-14.66	74	-34.66

PK - Peak detector

26-40GHz Test.TST 30915 2 Aug 2013 Rev 9.5 19 Jan 2014

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7.6.5. Spurious Emissions 40 TO 200 GHz- RFEM0

PEAK MEASUREMENT

Note: The peak density is less than the average limit

CHANNEL 1

Frequency (GHz)	Measurement Distance (m)	Peak Power (dBm)	Rx Antenna Gain (dBi)	EIRP (dBm)
55.147	0.010	-19.85	20.00	-12.6
EIRP (W)	**Specification Distance (m)**	**Power Density (W/m^2)**	**Power Density (pW/cm^2)**	**Limit (pW/cm^2)**
5.52E-05	3.0	4.88E-07	48.82	90

CHANNEL 1

Frequency (GHz)	Measurement Distance (m)	Peak Power (dBm)	Rx Antenna Gain (dBi)	EIRP (dBm)
60.938	0.010	-22.24	20.00	-14.1
EIRP (W)	**Specification Distance (m)**	**Power Density (W/m^2)**	**Power Density (pW/cm^2)**	**Limit (pW/cm^2)**
3.89E-05	3.0	3.44E-07	34.38	90

No other emissions up to 200 GHz detected above the noise floor.

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PEAK MEASUREMENT

Note: The peak density is less than the average limit

CHANNEL 2

Frequency (GHz)	Measurement Distance (m)	Peak Power (dBm)	Rx Antenna Gain (dBi)	EIRP (dBm)
57.321	0.010	-21.12	20.00	-13.5
EIRP (W)	**Specification Distance (m)**	**Power Density (W/m^2)**	**Power Density (pW/cm^2)**	**Limit (pW/cm^2)**
4.45E-05	3.0	3.94E-07	39.37	90

CHANNEL 2

Frequency (GHz)	Measurement Distance (m)	Peak Power (dBm)	Rx Antenna Gain (dBi)	EIRP (dBm)
57.225	0.010	-20.78	20.00	-13.2
EIRP (W)	**Specification Distance (m)**	**Power Density (W/m^2)**	**Power Density (pW/cm^2)**	**Limit (pW/cm^2)**
4.80E-05	3.0	4.25E-07	42.47	90

No other emissions up to 200 GHz detected above the noise floor.

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PEAK MEASUREMENT

Note: The peak density is less than the average limit

CHANNEL 3

Frequency (GHz)	Measurement Distance (m)	Peak Power (dBm)	Rx Antenna Gain (dBi)	EIRP (dBm)
51.8	0.010	-18.22	20.00	-11.5
EIRP (W)	**Specification Distance (m)**	**Power Density (W/m^2)**	**Power Density (pW/cm^2)**	**Limit (pW/cm^2)**
7.09E-05	3.0	6.27E-07	62.69	90

CHANNEL 3

Frequency (GHz)	Measurement Distance (m)	Peak Power (dBm)	Rx Antenna Gain (dBi)	EIRP (dBm)
54.1556	0.010	-22.21	20.00	-15.1
EIRP (W)	**Specification Distance (m)**	**Power Density (W/m^2)**	**Power Density (pW/cm^2)**	**Limit (pW/cm^2)**
3.09E-05	3.0	2.73E-07	27.34	90

No other emissions up to 200 GHz detected above the noise floor.

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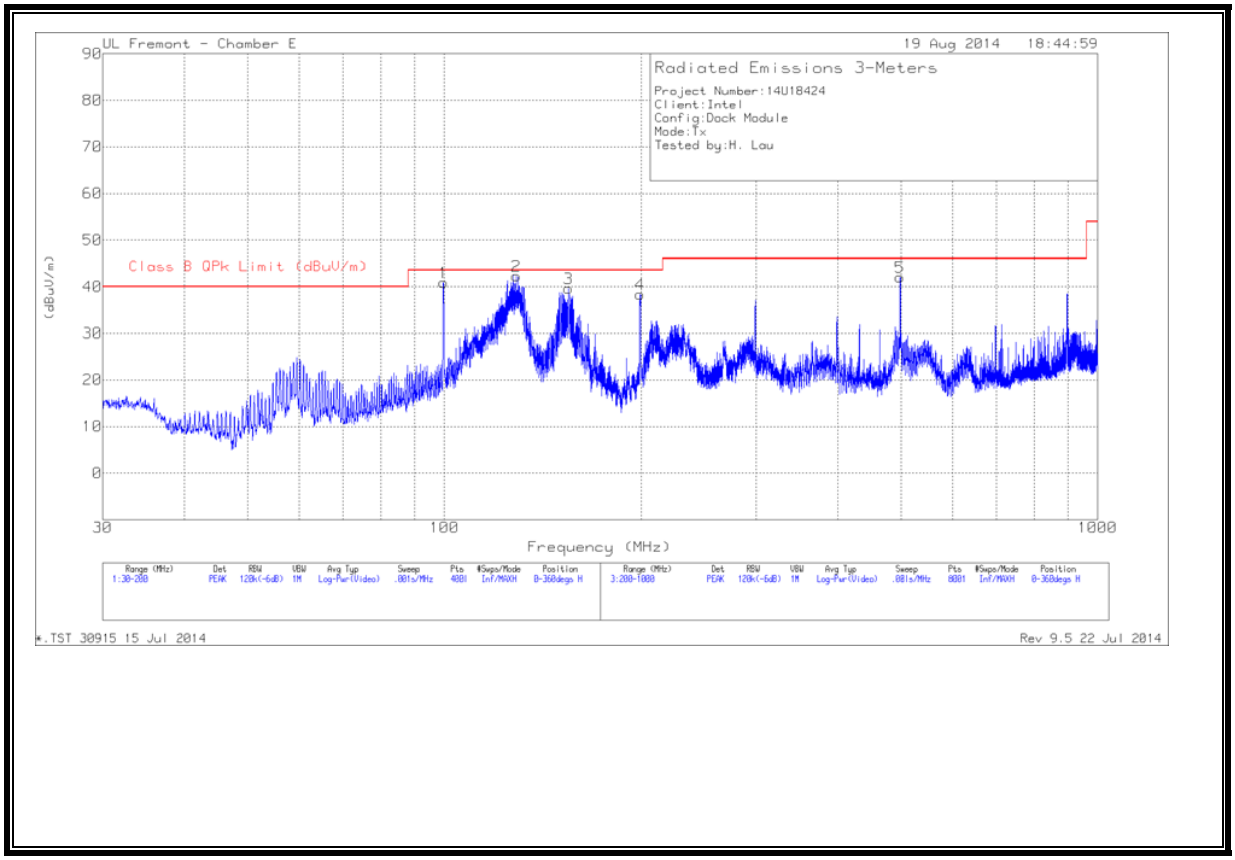
7.6.6. Spurious Emissions 30MHz TO 1 GHz- RFEM1

TX SPURIOUS EMISSION 30 TO 1000 MHz (HORIZONTAL PLOT)



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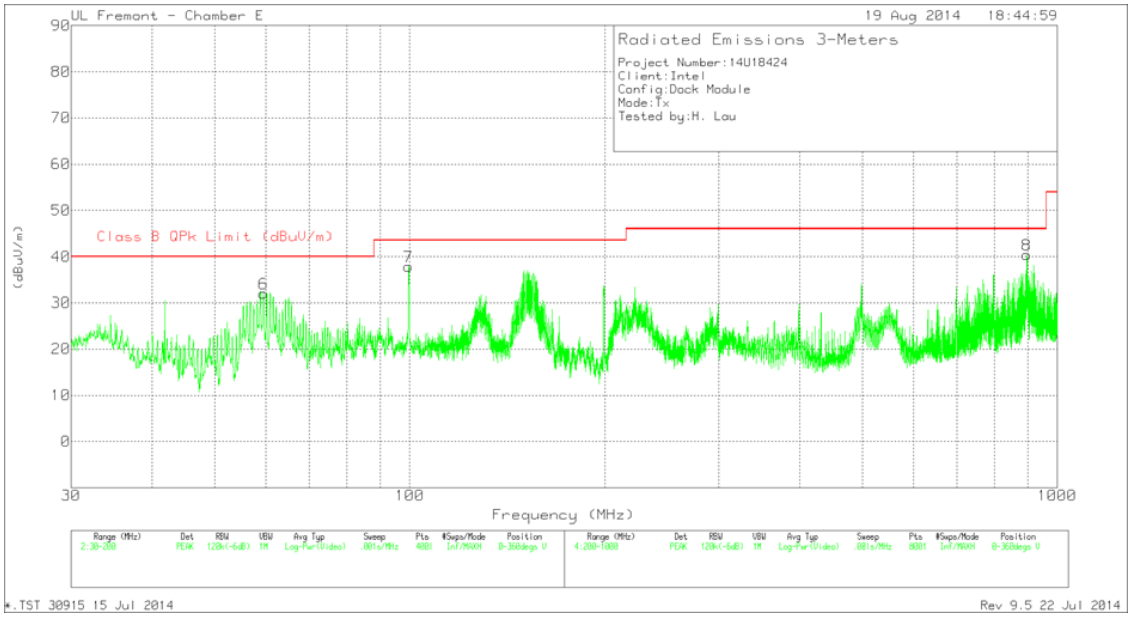
TX SPURIOUS EMISSION 30 TO 1000 MHz (VERTICAL PLOT)



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TX SPURIOUS EMISSION 30MHz-1GHz

Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Hybrid	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	Class B QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
6	59.495	56.33	PK	7.4	-31.7	32.03	40	-7.97	0-360	100	V
7	99.615	59.32	PK	10	-31.4	37.92	43.52	-5.6	0-360	100	V
1	99.785	62.26	PK	10	-31.4	40.86	43.52	-2.66	0-360	301	H
2	128.8975	59.72	PK	13.7	-31.1	42.32	43.52	-1.2	0-360	201	H
3	154.8225	58.36	PK	12.3	-31	39.66	43.52	-3.86	0-360	201	H
4	199.15	56.89	PK	12.3	-30.8	38.39	43.52	-5.13	0-360	100	H
5	497.9	54.31	PK	17.4	-29.6	42.11	46.02	-3.91	0-360	100	H
8	897.7	46.62	PK	22	-28.2	40.42	46.02	-5.6	0-360	99	V

PK - Peak detector

Radiated Emissions

Marker	Freq. (MHz)	Meter Reading (dBuV)	Det	Hybrid	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	Class B QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
6	59.43	56.35	QP	7.4	-31.7	32.05	40	-7.95	358	100	V
1	99.59	61.59	QP	10	-31.4	40.19	43.52	-3.33	155	297	H
7	99.59	58.72	QP	10	-31.4	37.32	43.52	-6.2	113	100	V
2	128.84	57.63	QP	13.7	-31.2	40.13	43.52	-3.39	146	205	H
3	154.72	56.49	QP	12.3	-31	37.79	43.52	-5.73	188	173	H
4	199.17	56.27	QP	12.3	-30.8	37.77	43.52	-5.75	203	176	H
5	498.89	53.06	QP	17.3	-29.6	40.76	46.02	-5.26	188	101	H
8	897.44	40.69	QP	22.1	-28.2	34.59	46.02	-11.43	212	108	V

QP - Quasi-Peak detector

*.TST 30915 15 Jul 2014

Rev 9.5 22 Jul 2014

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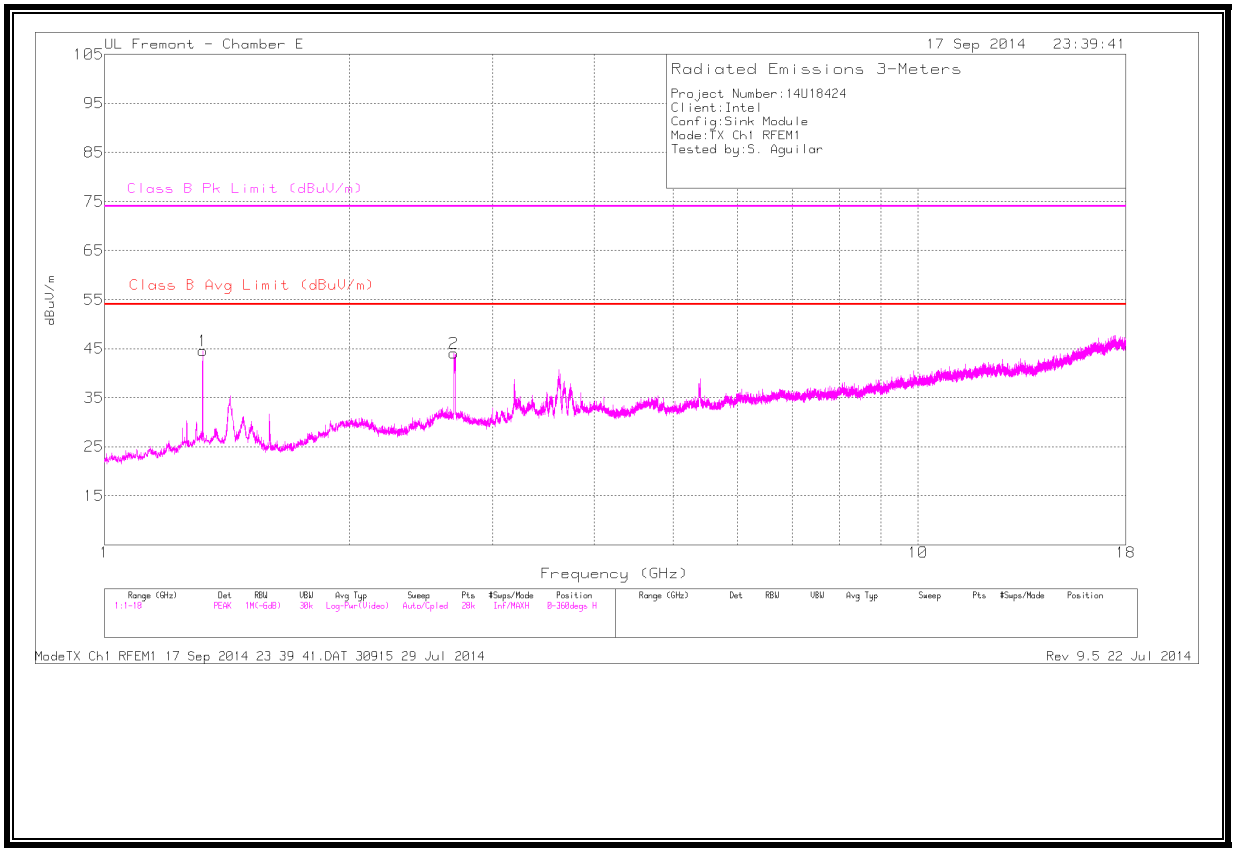
7.6.7. Spurious Emissions 1 TO 18 GHz- RFEM1

CHANNEL 1 - TX SPURIOUS EMISSION 1-18 GHz (HORIZONTAL PLOT)



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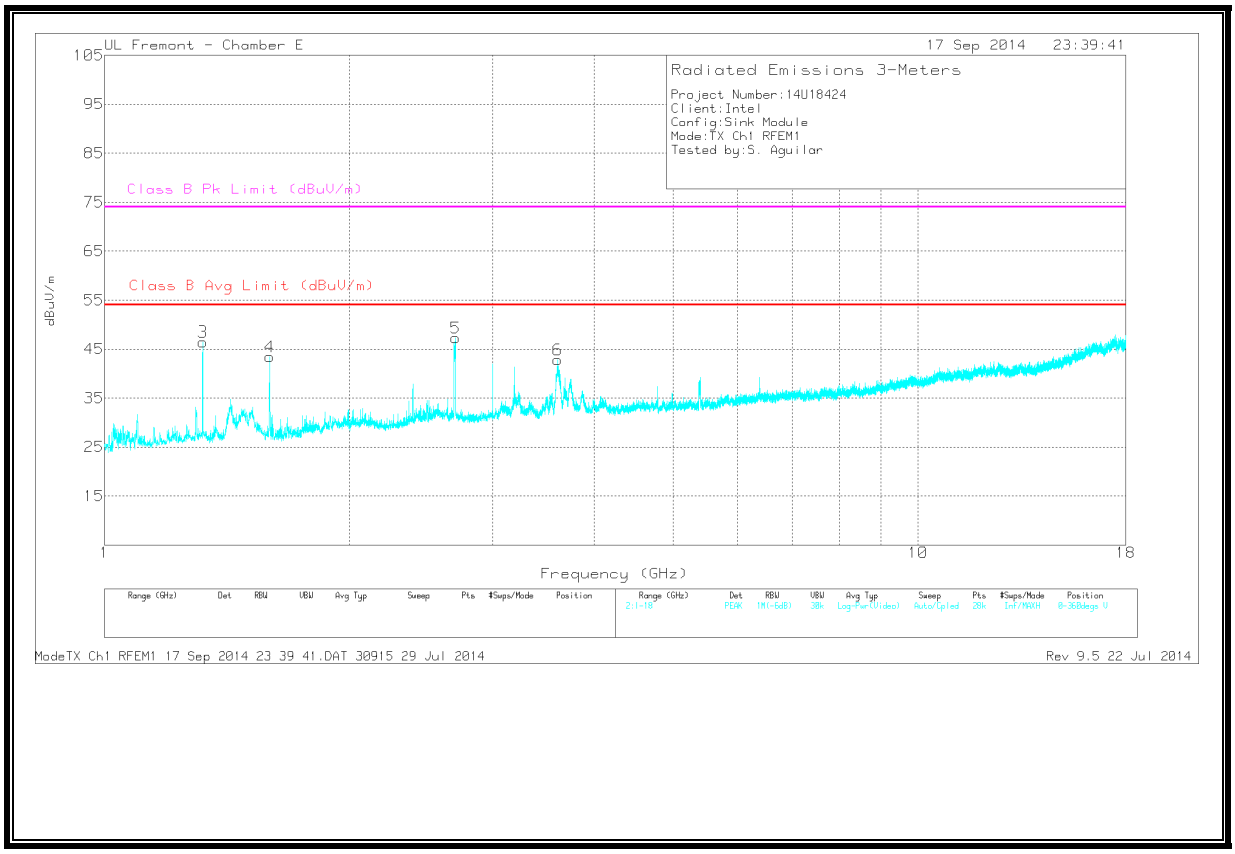
CHANNEL 1 – TX SPURIOUS EMISSION 1-18 GHz (VERTICAL PLOT)



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CHANNEL 1 TX SPURIOUS EMISSION 1-18 GHz

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (dB/m)	Amp/Cbl (dB)	Corrected Reading dBuV/m	Class B Avg Limit (dBuV/m)	Av(CISPR) Margin (dB)	Class B Pk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	1.32	50.15	PK	29	-34.6	44.55	-	-	74	-29.45	0-360	101	H
3	1.32	52.09	PK	29	-34.6	46.49	-	-	74	-27.51	0-360	101	V
4	1.596	49.13	PK	28.4	-34.1	43.43	-	-	74	-30.57	0-360	200	V
2	2.689	44.56	PK	32.5	-33	44.06	-	-	74	-29.94	0-360	200	H
5	2.699	47.63	PK	32.5	-32.8	47.33	-	-	74	-26.67	0-360	101	V
6	3.607	41.88	PK	33.1	-32.2	42.78	-	-	74	-31.22	0-360	200	V

PK - Peak detector

Radiated Emissions

Marker	Freq. (GHz)	Meter Reading (dBuV)	Det	AF T346 (dB/m)	Amp/Cbl (dB)	Corrected Reading dBuV/m	Class B Avg Limit (dBuV/m)	Av(CISPR) Margin (dB)	Class B Pk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Pol.
1	1.32	54.97	PK	29	-34.6	49.37	-	-	74	-24.63	191	105	H
1	1.32	53.43	Avg	29	-34.6	47.83	54	-6.17	-	-	191	105	H
3	1.32	54.59	PK	29	-34.6	48.99	-	-	74	-25.01	235	113	V
3	1.32	52.83	Avg	29	-34.6	47.23	54	-6.77	-	-	235	113	V
4	1.596	61.05	PK	28.4	-34.1	55.35	-	-	74	-18.65	143	216	V
4	1.596	34.59	Avg	28.4	-34.1	28.89	54	-25.11	-	-	143	216	V
2	2.695	61.14	PK	32.5	-32.8	60.84	-	-	74	-13.16	265	188	H
2	2.695	42.82	Avg	32.5	-32.8	42.52	54	-11.48	-	-	265	188	H
5	2.7	64.29	PK	32.5	-32.8	63.99	-	-	74	-10.01	164	139	V
5	2.7	43.39	Avg	32.5	-32.8	43.09	54	-10.91	-	-	164	139	V
6	3.607	49.39	PK	33.1	-32.1	50.39	-	-	74	-23.61	240	199	V
6	3.607	38.06	Avg	33.1	-32.1	39.06	54	-14.94	-	-	240	199	V

PK - Peak detector

Avg - Video bandwidth < Resolution bandwidth

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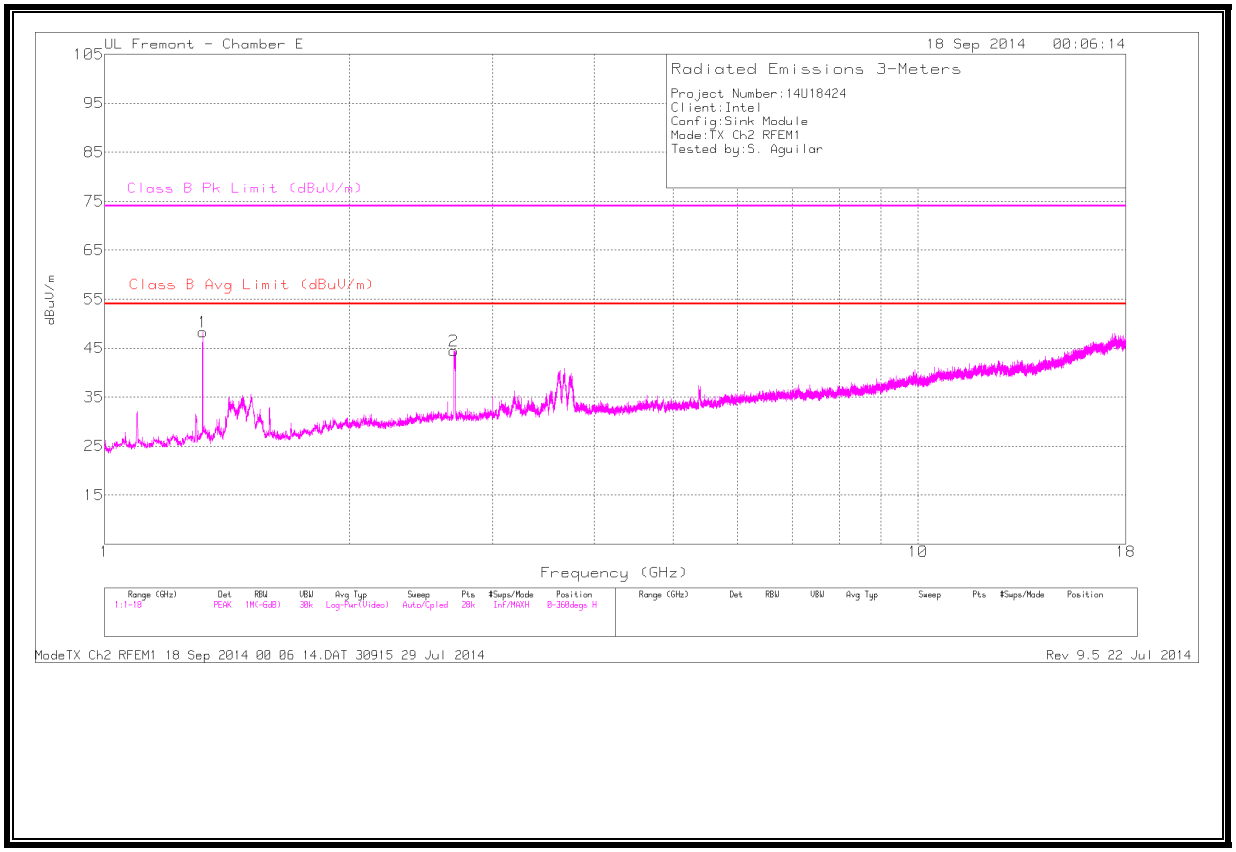
CHANNEL 2 - TX SPURIOUS EMISSION 1-18 GHz (HORIZONTAL PLOT)



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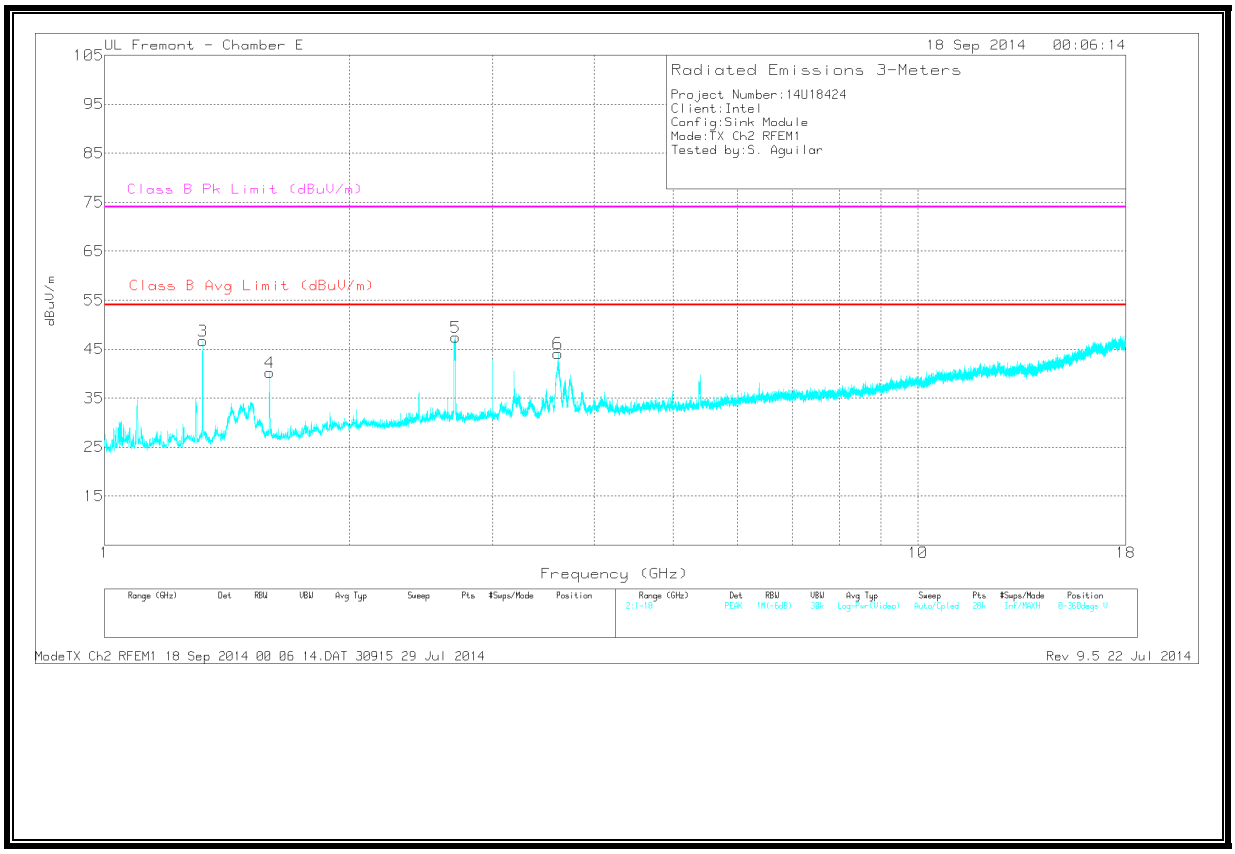
CHANNEL 2 – TX SPURIOUS EMISSION 1-18 GHz (VERTICAL PLOT)



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CHANNEL 2 TX SPURIOUS EMISSION 1-18 GHz

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (dB/m)	Amp/Cbl (dB)	Corrected Reading dBuV/m	Class B Avg Limit (dBuV/m)	Av(CISPR) Margin (dB)	Class B Pk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	1.32	53.95	PK	29	-34.6	48.35	-	-	74	-25.65	0-360	100	H
3	1.32	52.3	PK	29	-34.6	46.7	-	-	74	-27.3	0-360	200	V
4	1.596	45.88	PK	28.4	-34.1	40.18	-	-	74	-33.82	0-360	200	V
2	2.689	45	PK	32.5	-33	44.5	-	-	74	-29.5	0-360	200	H
5	2.699	47.7	PK	32.5	-32.8	47.4	-	-	74	-26.6	0-360	101	V
6	3.609	43.23	PK	33.1	-32.2	44.13	-	-	74	-29.87	0-360	200	V

PK - Peak detector

Radiated Emissions

Marker	Freq. (GHz)	Meter Reading (dBuV)	Det	AF T346 (dB/m)	Amp/Cbl (dB)	Corrected Reading dBuV/m	Class B Avg Limit (dBuV/m)	Av(CISPR) Margin (dB)	Class B Pk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Pol.
1	1.32	55.72	PK	29	-34.6	50.12	-	-	74	-23.88	198	106	H
1	1.32	54.36	Avg	29	-34.6	48.76	54	-5.24	-	-	198	106	H
3	1.32	53.39	PK	29	-34.6	47.79	-	-	74	-26.21	186	221	V
3	1.32	52	Avg	29	-34.6	46.4	54	-7.6	-	-	186	221	V
4	1.594	62.39	PK	28.4	-34.1	56.69	-	-	74	-17.31	160	151	V
4	1.594	34.49	Avg	28.4	-34.1	28.79	54	-25.21	-	-	160	151	V
2	2.688	59.11	PK	32.5	-33	58.61	-	-	74	-15.39	96	211	H
2	2.688	39.79	Avg	32.5	-33	39.29	54	-4.71	-	-	96	211	H
5	2.688	64.34	PK	32.5	-33	63.84	-	-	74	-10.16	160	178	V
5	2.688	43.14	Avg	32.5	-33	42.64	54	-11.36	-	-	160	178	V
6	3.598	47.95	PK	33.1	-32.1	48.95	-	-	74	-25.05	242	200	V
6	3.598	37.02	Avg	33.1	-32.1	38.02	54	-15.98	-	-	242	200	V

PK - Peak detector

Avg - Video bandwidth < Resolution bandwidth

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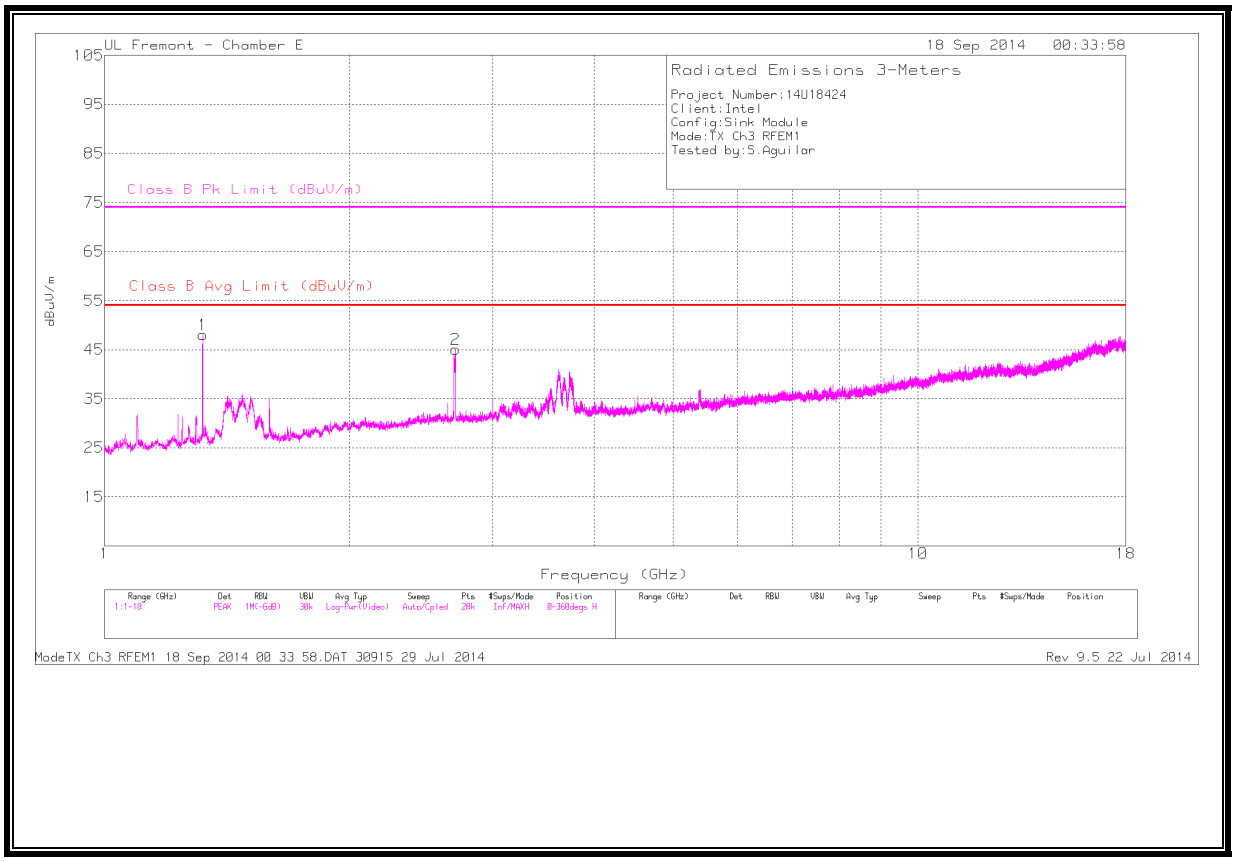
CHANNEL 3 - TX SPURIOUS EMISSION 1-18 GHz (HORIZONTAL PLOT)



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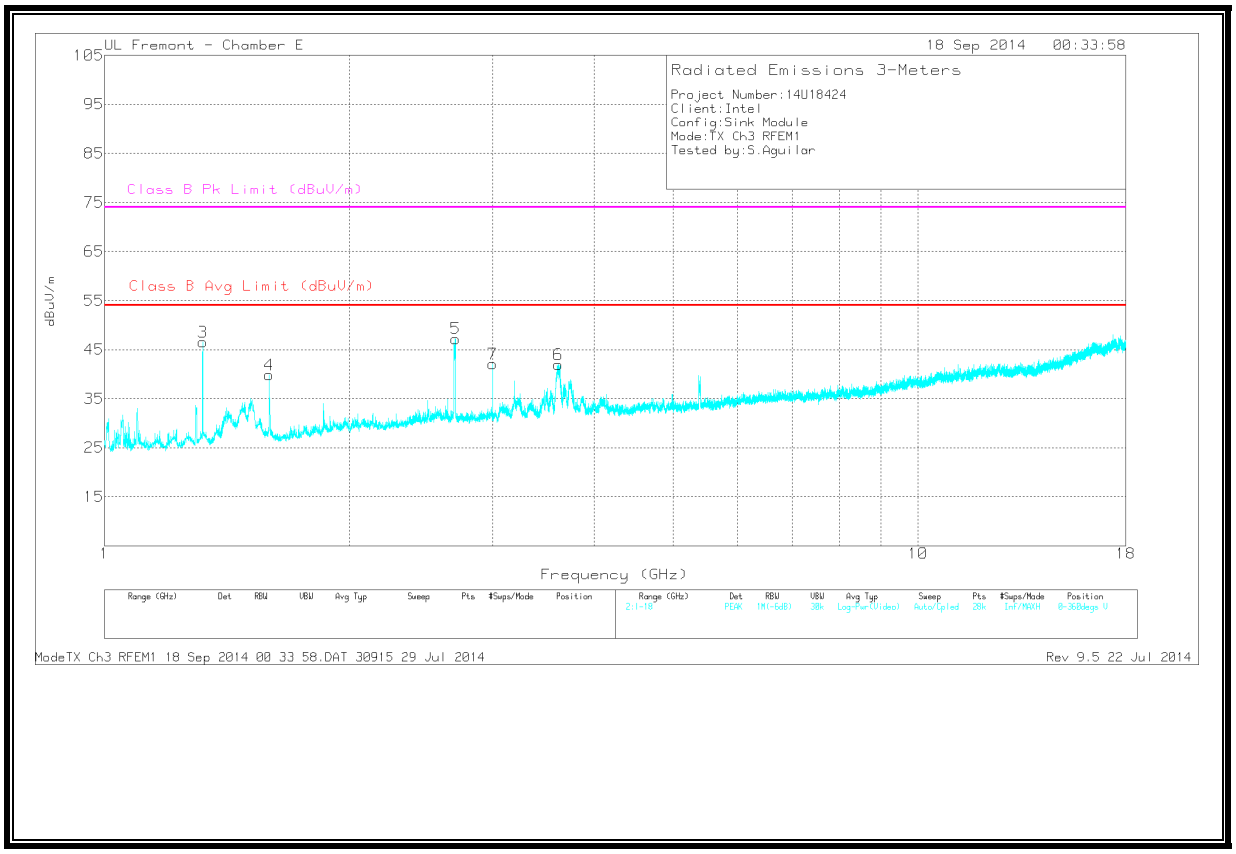
CHANNEL 3 – TX SPURIOUS EMISSION 1-18 GHz (VERTICAL PLOT)



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CHANNEL 3TX SPURIOUS EMISSION 1-18 GHz

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (dB/m)	Amp/Cbl (dB)	Corrected Reading dBuV/m	Class B Avg Limit (dBuV/m)	Av(CISPR) Margin (dB)	Class B Pk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	1.32	53.69	PK	29	-34.6	48.09	-	-	74	-25.91	0-360	99	H
3	1.32	52.11	PK	29	-34.6	46.51	-	-	74	-27.49	0-360	101	V
4	1.593	45.53	PK	28.4	-34.1	39.83	-	-	74	-34.17	0-360	101	V
2	2.699	45.31	PK	32.5	-32.8	45.01	-	-	74	-28.99	0-360	99	H
5	2.699	47.54	PK	32.5	-32.8	47.24	-	-	74	-26.76	0-360	101	V
7	3	42.03	PK	32.8	-32.7	42.13	-	-	74	-31.87	0-360	200	V
6	3.61	41.05	PK	33.1	-32.2	41.95	-	-	74	-32.05	0-360	200	V

PK - Peak detector

Radiated Emissions

Marker	Freq. (GHz)	Meter Reading (dBuV)	Det	AF T346 (dB/m)	Amp/Cbl (dB)	Corrected Reading dBuV/m	Class B Avg Limit (dBuV/m)	Av(CISPR) Margin (dB)	Class B Pk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	PoL.
1	1.32	56.15	PK	29	-34.6	50.55	-	-	74	-23.45	196	105	H
1	1.32	54.72	Avg	29	-34.6	49.12	54	-4.88	-	-	196	105	H
3	1.32	53.41	PK	29	-34.6	47.81	-	-	74	-26.19	242	107	V
3	1.32	51.63	Avg	29	-34.6	46.03	54	--7.97	-	-	242	107	V
4	1.594	56.7	PK	28.4	-34.1	51	-	-	74	-23	181	124	V
4	1.594	32.28	Avg	28.4	-34.1	26.58	54	-27.42	-	-	181	124	V
2	2.7	59.93	PK	32.5	-32.8	59.63	-	-	74	-14.37	118	257	H
2	2.7	39.32	Avg	32.5	-32.8	39.02	54	-14.98	-	-	118	257	H
5	2.7	64.53	PK	32.5	-32.8	64.23	-	-	74	-9.77	163	121	V
5	2.7	44.68	Avg	32.5	-32.8	44.38	54	-9.62	-	-	163	121	V
7	3	42.84	PK	32.8	-32.7	42.94	-	-	74	-31.06	115	218	V
7	3	36.76	Avg	32.8	-32.7	36.86	54	-17.14	-	-	115	218	V
6	3.609	48.58	PK	33.1	-32.2	49.48	-	-	74	-24.52	235	168	V
6	3.609	37.52	Avg	33.1	-32.2	38.42	54	-15.58	-	-	235	168	V

PK - Peak detector

Avg - Video bandwidth < Resolution bandwidth

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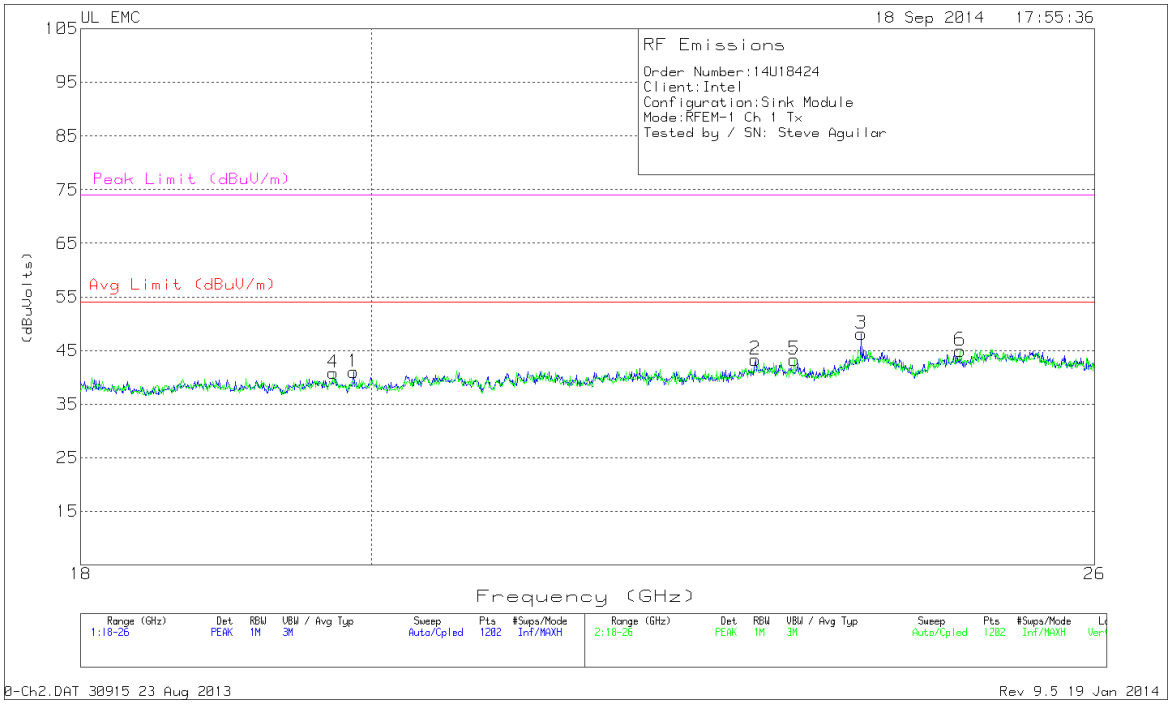
7.6.8. Spurious Emissions 18 to 26 GHz- RFEM1

CHANNEL 1 - TX SPURIOUS EMISSION 18 TO 26 GHz (HORIZONTAL AND VERTICAL PLOT)



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CHANNEL 1 -TX SPURIOUS EMISSION 18 TO 26 GHz

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T89 (dB/m)	Amp/Cbl (dB)	Dist Corr (dB)	Corrected Reading (dBuVolts)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)
1	19.872	41.6	PK	32.8	-23.9	-9.5	41	54	-13	74	-33
2	22.989	42.43	PK	33.6	-23.2	-9.5	43.33	54	-10.66	74	-30.66
3	23.888	46.77	PK	33.6	-22.7	-9.5	48.16	54	-5.83	74	-25.83
4	19.725	41.53	PK	32.7	-23.9	-9.5	40.83	54	-13.16	74	-33.16
5	23.316	42.53	PK	33.4	-23.1	-9.5	43.33	54	-10.66	74	-30.66
6	24.761	43.2	PK	34	-22.7	-9.5	45	54	-9	74	-29

PK - Peak detector

0-Ch2.DAT 30915 23 Aug 2013 Rev 9.5 19 Jan 2014

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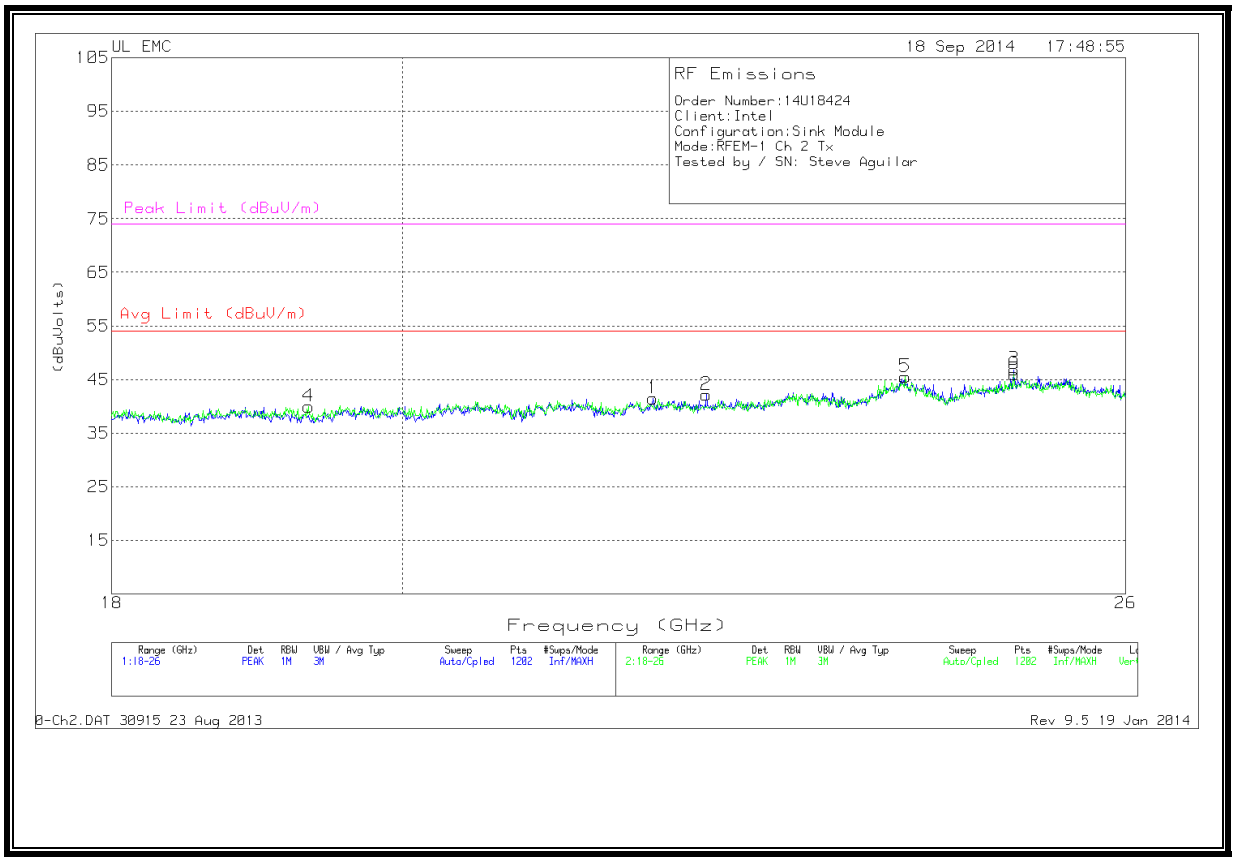
CHANNEL 2 - TX SPURIOUS EMISSION 18 TO 26 GHz (HORIZONTAL AND VERTICAL PLOT)



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CHANNEL 2 -TX SPURIOUS EMISSION 18 TO 26 GHz

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T89 (dB/m)	Amp/Cbl (dB)	Dist Corr (dB)	Corrected Reading (dBuVolts)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)
1	21.903	41.6	PK	33.3	-23.9	-9.5	41.5	54	-12.5	74	-32.5
2	22.33	41.67	PK	33.3	-23.3	-9.5	42.16	54	-11.83	74	-31.83
3	24.968	45.23	PK	34	-22.9	-9.5	46.83	54	-7.16	74	-27.16
4	19.332	40.8	PK	32.5	-23.8	-9.5	40	54	-14	74	-34
5	24.002	44.1	PK	33.6	-22.7	-9.5	45.5	54	-8.5	74	-28.5
6	24.968	44.4	PK	34	-22.9	-9.5	46	54	-8	74	-28

PK - Peak detector

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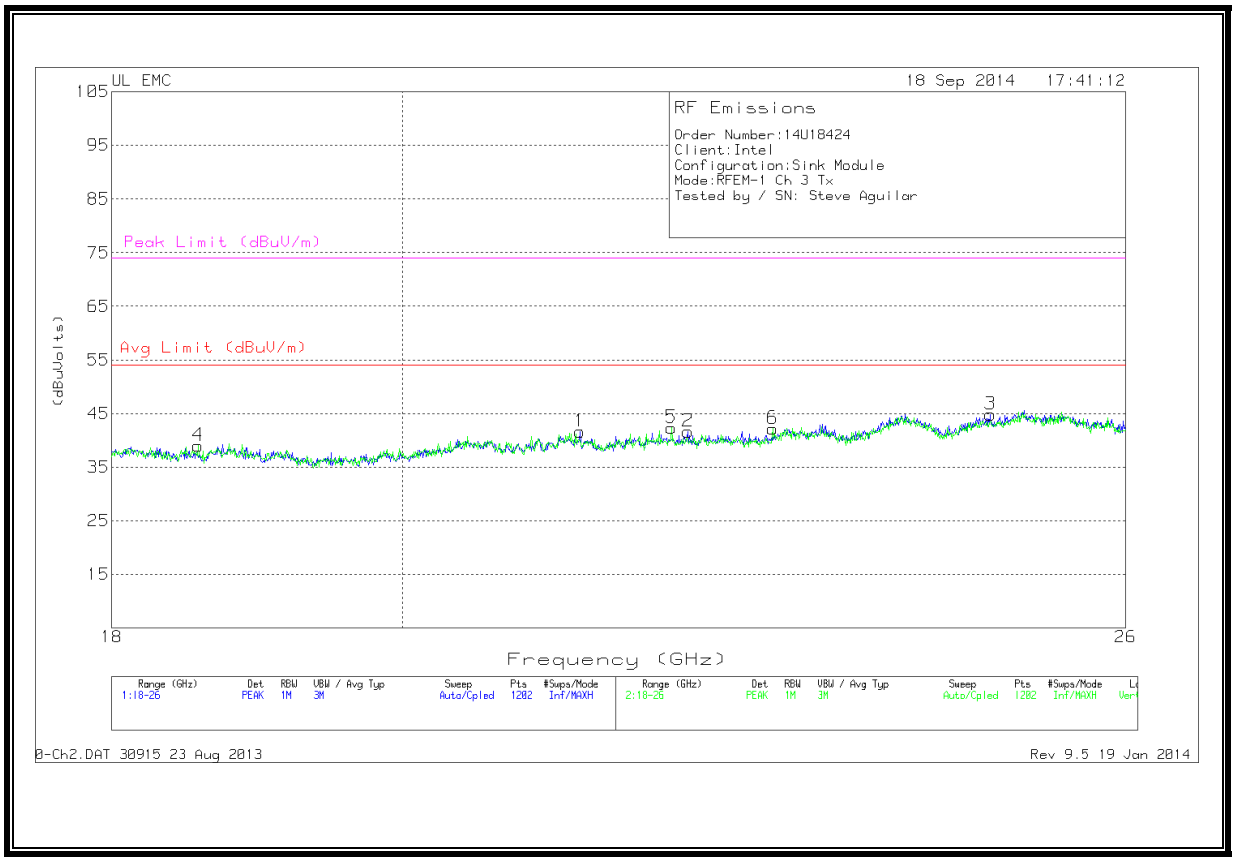
CHANNEL 3 - TX SPURIOUS EMISSION 18 TO 26 GHz (HORIZONTAL AND VERTICAL PLOT)



Measurement distance is 1 m

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CHANNEL 3 -TX SPURIOUS EMISSION 18 TO 26 GHz

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T89 (dB/m)	Amp/Cbl (dB)	Dist Corr (dB)	Corrected Reading (dBuVolts)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)
1	21.331	41.97	PK	33	-23.8	-9.5	41.66	54	-12.33	74	-32.33
2	22.183	41.07	PK	33.2	-23.1	-9.5	41.66	54	-12.33	74	-32.33
3	24.754	43.03	PK	34	-22.7	-9.5	44.83	54	-9.16	74	-29.16
4	18.573	40.2	PK	32.5	-24.2	-9.5	39	54	-15	74	-35
5	22.05	42.03	PK	33.3	-23.5	-9.5	42.33	54	-11.66	74	-31.66
6	22.876	41.57	PK	33.5	-23.4	-9.5	42.16	54	-11.83	74	-31.83

PK - Peak detector

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7.6.9. Spurious Emissions 26 TO 40 GHz- RFEM1

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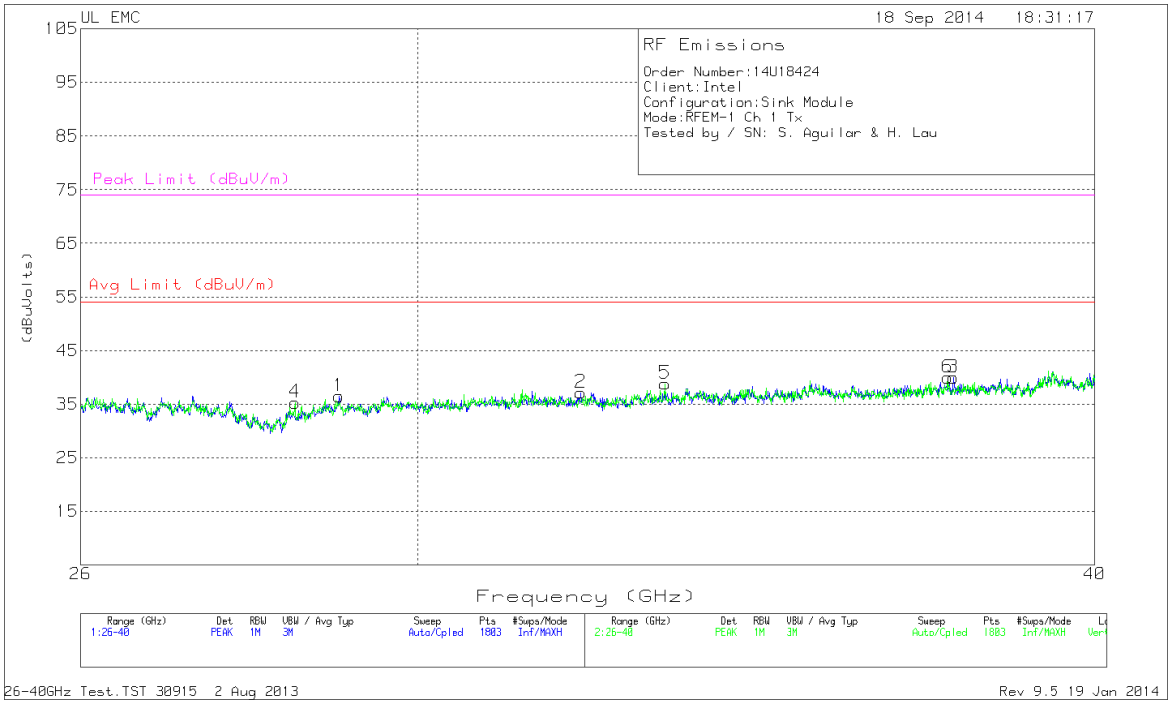

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CHANNEL 1 -TX SPURIOUS EMISSION 26 TO 40 GHz

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	T90 AF (dB/m)	Amp /Cbl (dB)	Dist Corr (dB)	Corrected Reading (dBuVolts)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)
1	29.014	45.2	PK	35.9	-35.1	-9.5	36.5	54	-17.5	74	-37.5
2	32.153	47.27	PK	36.4	-37	-9.5	37.16	54	-16.83	74	-36.83
3	37.669	51.3	PK	37.1	-38.9	-9.5	40	54	-14	74	-34
4	28.478	44.63	PK	35.7	-35.5	-9.5	35.33	54	-18.66	74	-38.66
5	33.326	48.73	PK	37	-37.4	-9.5	38.83	54	-15.16	74	-35.16
6	37.576	51.4	PK	37.2	-39.1	-9.5	40	54	-14	74	-34

PK - Peak detector

26-40GHz Test.TST 30915 2 Aug 2013 Rev 9.5 19 Jan 2014

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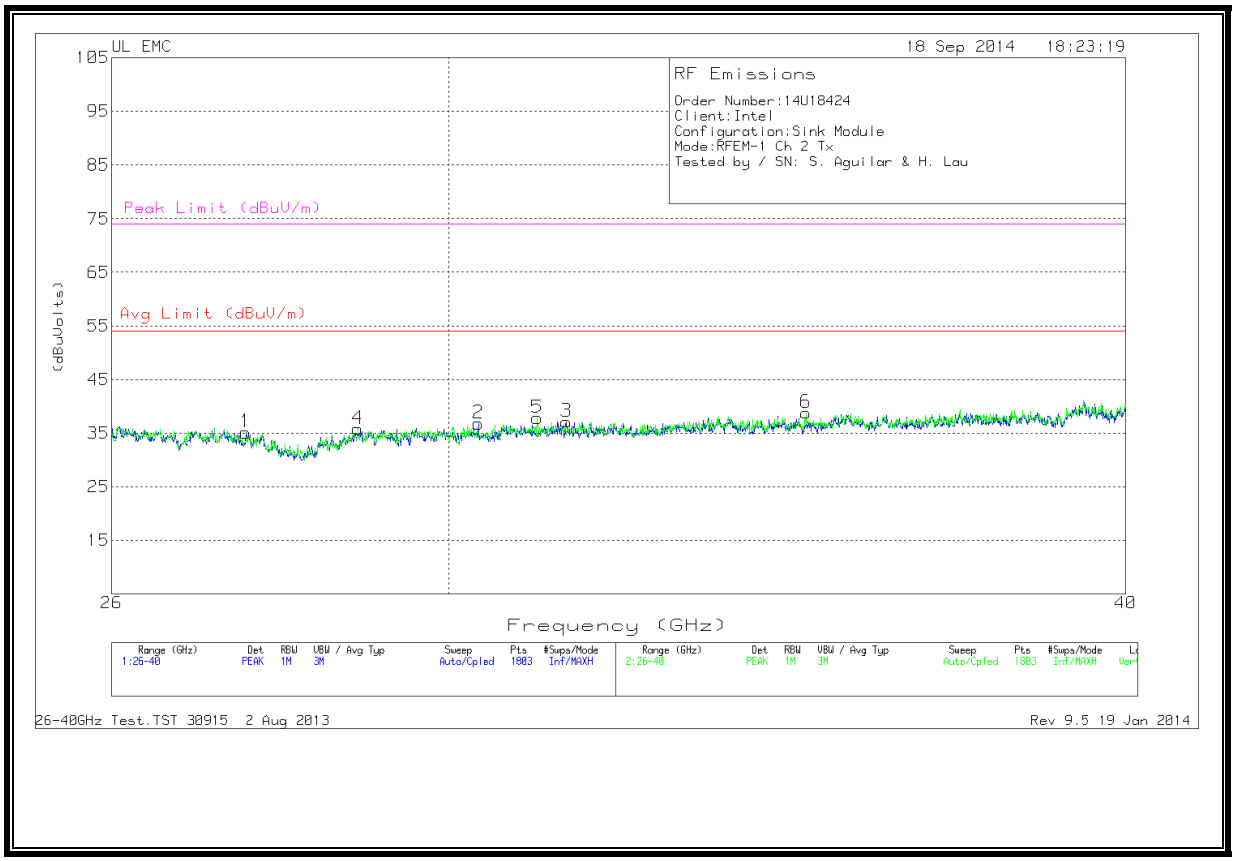
CHANNEL 2 - TX SPURIOUS EMISSION 26 TO 40 GHz (HORIZONTAL AND VERTICAL PLOT)



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CHANNEL 2 -TX SPURIOUS EMISSION 26 TO 40 GHz

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	T90 AF (dB/m)	Amp/Cbl (dB)	Dist Corr (dB)	Corrected Reading (dBuVolts)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)
1	27.523	43.67	PK	35.7	-34.7	-9.5	35.16	54	-18.83	74	-38.83
2	30.382	47.43	PK	35.9	-37	-9.5	36.83	54	-17.16	74	-37.16
3	31.539	47.77	PK	36.2	-37.3	-9.5	37.16	54	-16.83	74	-36.83
4	28.867	45.43	PK	35.8	-35.9	-9.5	35.83	54	-18.16	74	-38.16
5	31.151	48.73	PK	35.9	-37.3	-9.5	37.83	54	-16.16	74	-36.16
6	34.919	49.43	PK	37.2	-38.3	-9.5	38.83	54	-15.16	74	-35.16

PK - Peak detector

26-40GHz Test.TST 30915 2 Aug 2013 Rev 9.5 19 Jan 2014

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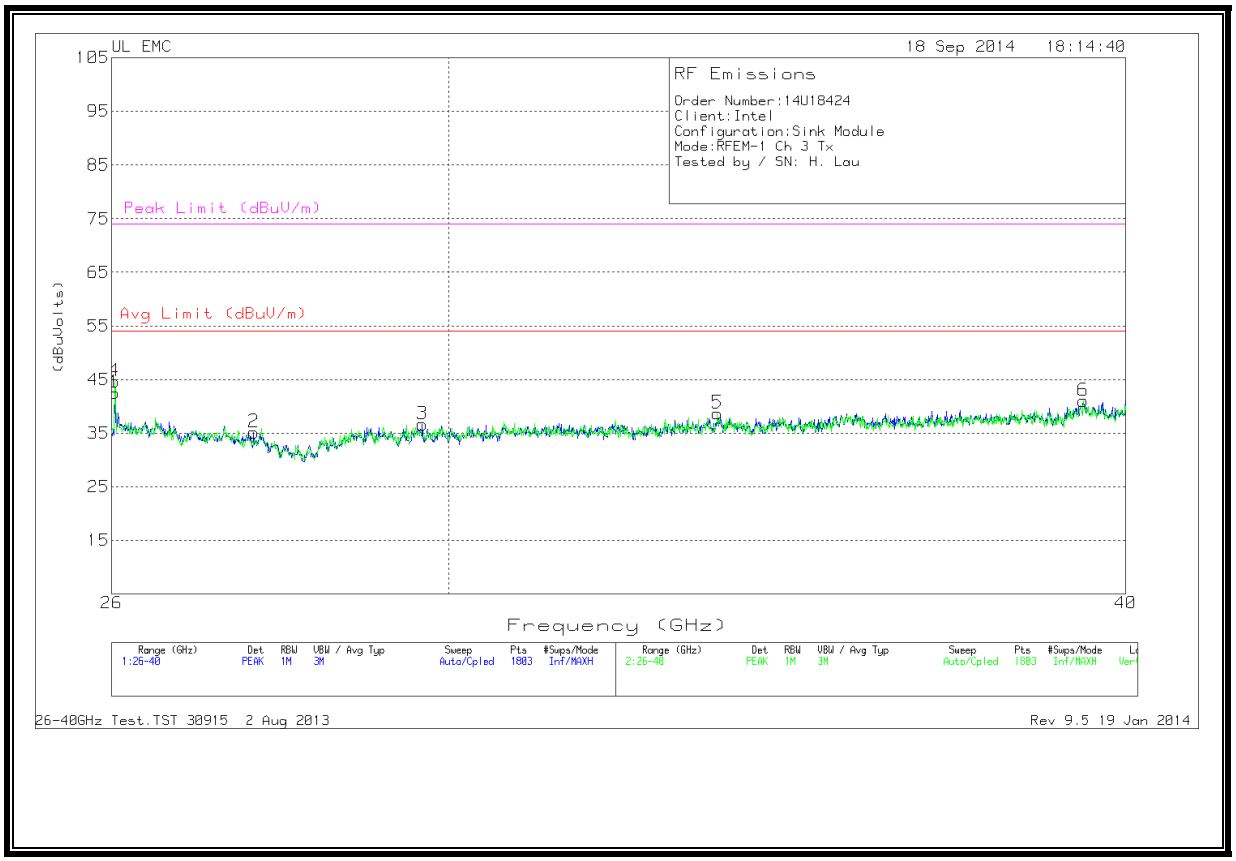
CHANNEL 3 - TX SPURIOUS EMISSION 26 TO 40 GHz (HORIZONTAL AND VERTICAL PLOT)



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CHANNEL 3 -TX SPURIOUS EMISSION 26 TO 40 GHz

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	T90 AF (dB/m)	Amp/Cbl (dB)	Dist Corr (dB)	Corrected Reading (dBuVolts)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)
1	26.031	50.5	PK	35.6	-34.1	-9.5	42.5	54	-11.5	74	-31.5
2	27.616	44.07	PK	35.8	-35.2	-9.5	35.16	54	-18.83	74	-38.83
3	29.667	46.77	PK	36	-36.6	-9.5	36.66	54	-17.33	74	-37.33
4	26.031	52.67	PK	35.6	-34.1	-9.5	44.66	54	-9.33	74	-29.33
5	33.629	47.97	PK	37	-36.8	-9.5	38.66	54	-15.33	74	-35.33
6	39.285	48.2	PK	38.4	-36.1	-9.5	41	54	-13	74	-33

PK - Peak detector

26-40GHz Test.TST 30915 2 Aug 2013 Rev 9.5 19 Jan 2014

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7.6.10.Spurious Emissions 40 TO 200 GHz- RFEM1

PEAK MEASUREMENT

Note: The peak density is less than the average limit

CHANNEL 1

Frequency (GHz)	Measurement Distance (m)	Peak Power (dBm)	Rx Antenna Gain (dBi)	EIRP (dBm)
55.028	0.010	-20.08	20.00	-12.8
EIRP (W)	**Specification Distance (m)**	**Power Density (W/m^2)**	**Power Density (pW/cm^2)**	**Limit (pW/cm^2)**
5.21E-05	3.0	4.61E-07	46.10	90

CHANNEL 1

Frequency (GHz)	Measurement Distance (m)	Peak Power (dBm)	Rx Antenna Gain (dBi)	EIRP (dBm)
61.01	0.010	-22.32	20.00	-14.2
EIRP (W)	**Specification Distance (m)**	**Power Density (W/m^2)**	**Power Density (pW/cm^2)**	**Limit (pW/cm^2)**
3.82E-05	3.0	3.38E-07	33.83	90

No other emissions up to 200 GHz detected above the noise floor.

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PEAK MEASUREMENT

Note: The peak density is less than the average limit

CHANNEL 2

Frequency (GHz)	Measurement Distance (m)	Peak Power (dBm)	Rx Antenna Gain (dBi)	EIRP (dBm)
57.205	0.010	-20.44	20.00	-12.9
EIRP (W)	**Specification Distance (m)**	**Power Density (W/m^2)**	**Power Density (pW/cm^2)**	**Limit (pW/cm^2)**
5.18E-05	3.0	4.59E-07	45.86	90

CHANNEL 2

Frequency (GHz)	Measurement Distance (m)	Peak Power (dBm)	Rx Antenna Gain (dBi)	EIRP (dBm)
52.305	0.010	-23.79	20.00	-17.0
EIRP (W)	**Specification Distance (m)**	**Power Density (W/m^2)**	**Power Density (pW/cm^2)**	**Limit (pW/cm^2)**
2.00E-05	3.0	1.77E-07	17.73	90

No other emissions up to 200 GHz detected above the noise floor.

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PEAK MEASUREMENT

Note: The peak density is less than the average limit

CHANNEL 3

Frequency (GHz)	Measurement Distance (m)	Peak Power (dBm)	Rx Antenna Gain (dBi)	EIRP (dBm)
51.885	0.010	-18.71	20.00	-12.0
EIRP (W)	**Specification Distance (m)**	**Power Density (W/m^2)**	**Power Density (pW/cm^2)**	**Limit (pW/cm^2)**
6.35E-05	3.0	5.62E-07	56.18	90

CHANNEL 3

Frequency (GHz)	Measurement Distance (m)	Peak Power (dBm)	Rx Antenna Gain (dBi)	EIRP (dBm)
59.36	0.010	-22.45	20.00	-14.5
EIRP (W)	**Specification Distance (m)**	**Power Density (W/m^2)**	**Power Density (pW/cm^2)**	**Limit (pW/cm^2)**
3.51E-05	3.0	3.11E-07	31.08	90

No other emissions up to 200 GHz detected above the noise floor.

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7.7. AC MAINS LINE CONDUCTED EMISSIONS

LIMITS

§15.207

Frequency range (MHz)	Limits (dBµV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

Notes:
1. The lower limit shall apply at the transition frequencies
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.

TEST PROCEDURE

ANSI C63.4

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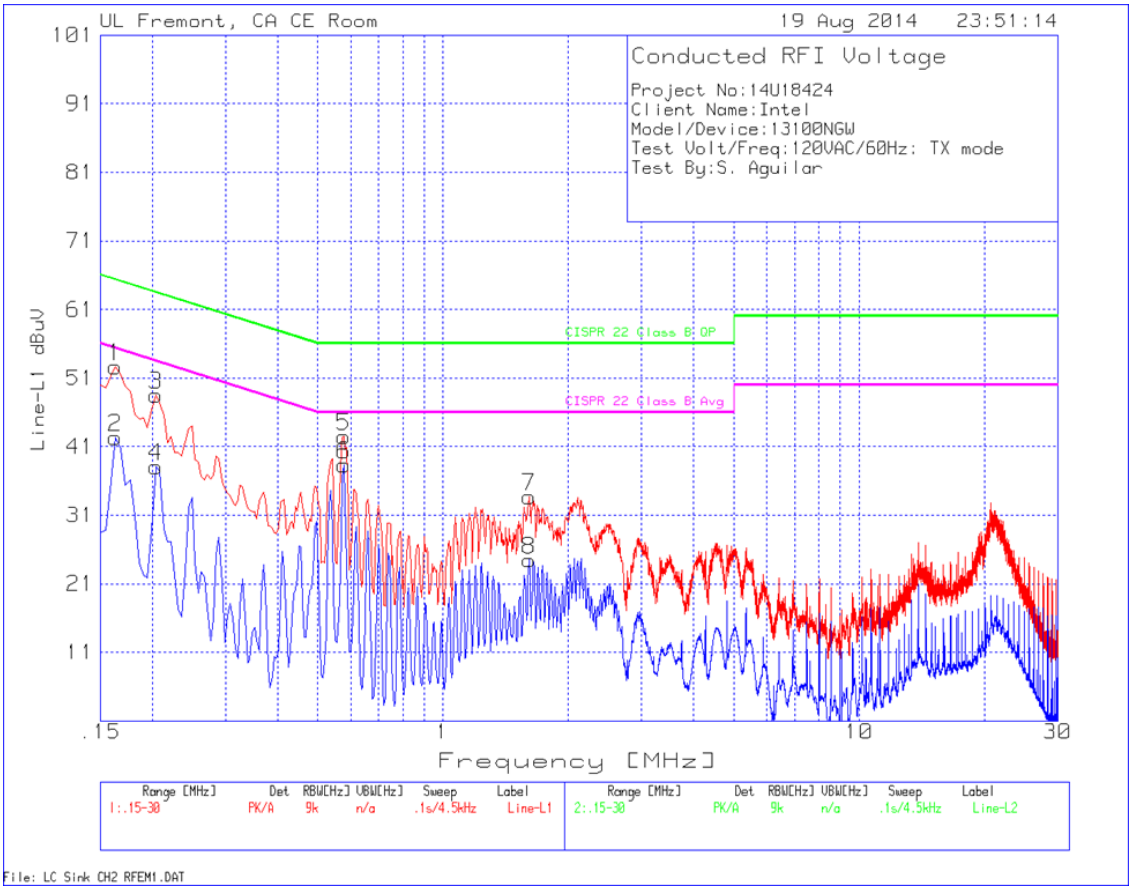
6 WORST EMISSIONS

LINE 1 RESULTS



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Line-L1 .15 - 30MHz

Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L1 (dB)	LC Cables 1&3 (dB)	Corrected Reading dBuV	CISPR 22 Class B QP	Margin to Limit (dB)	CISPR 22 Class B Avg	Margin to Limit (dB)
1	.1635	51.44	PK	1.2	0	52.64	65.3	-12.66	-	-
2	.1635	41.11	Av	1.2	0	42.31	-	-	55.3	-12.99
3	.204	47.67	PK	.9	0	48.57	63.4	-14.83	-	-
4	.204	37.2	Av	.9	0	38.1	-	-	53.4	-15.3
5	.5775	42.14	PK	.3	0	42.44	56	-13.56	-	-
6	.5775	38.07	Av	.3	0	38.37	-	-	46	-7.63
7	1.608	33.37	PK	.2	.1	33.67	56	-22.33	-	-
8	1.608	24.18	Av	.2	.1	24.48	-	-	46	-21.52

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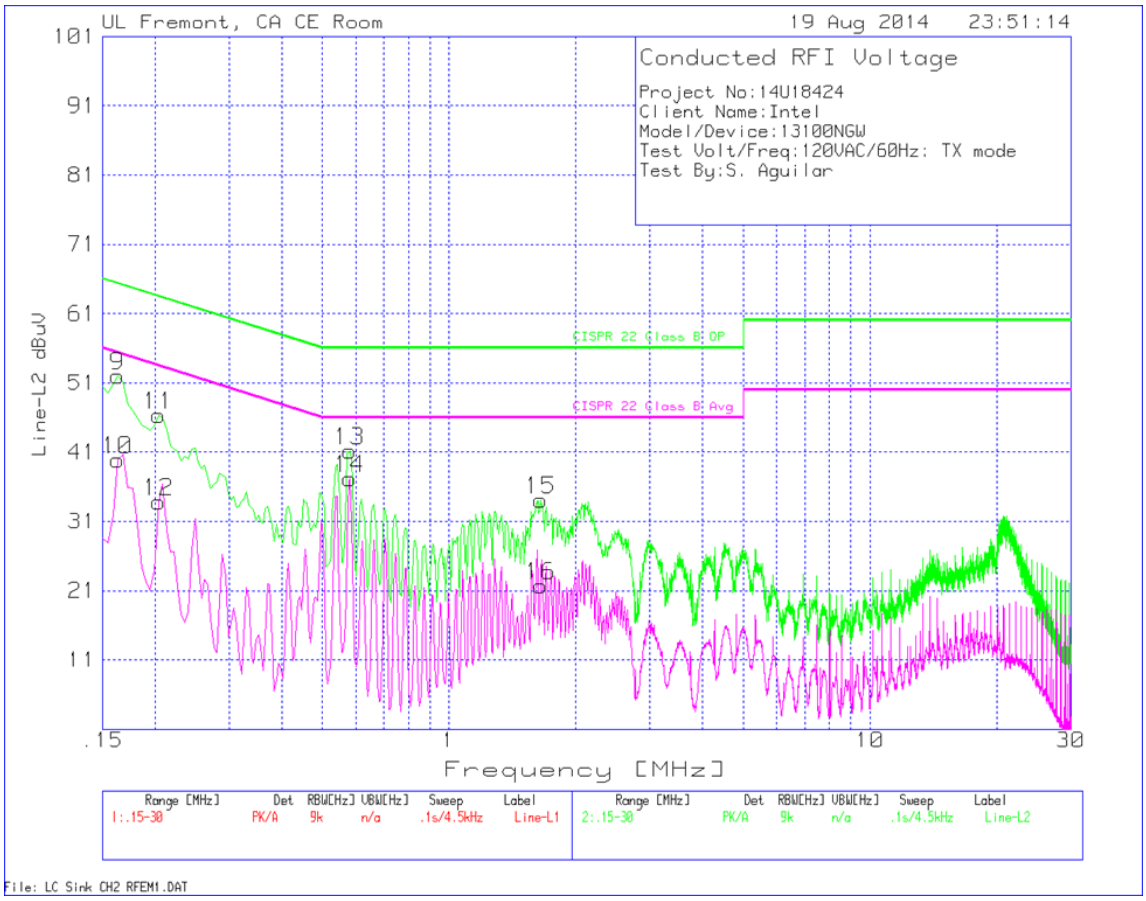
LINE 2 RESULTS



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Line-L2 .15 - 30MHz

Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L2 (dB)	LC Cables 2&3 (dB)	Corrected Reading dBuV	CISPR 22 Class B QP	Margin to Limit (dB)	CISPR 22 Class B Avg	Margin to Limit (dB)
9	.1635	50.66	PK	1.3	0	51.96	65.3	-13.34	-	-
10	.1635	38.63	Av	1.3	0	39.93	-	-	55.3	-15.37
11	.204	45.28	PK	1	0	46.28	63.4	-17.12	-	-
12	.204	32.81	Av	1	0	33.81	-	-	53.4	-19.59
13	.582	40.84	PK	.3	0	41.14	56	-14.86	-	-
14	.582	36.89	Av	.3	0	37.19	-	-	46	-8.81
15	1.6485	33.78	PK	.2	.1	34.08	56	-21.92	-	-
16	1.6485	21.45	Av	.2	.1	21.75	-	-	46	-24.25

PK - Peak detector

Av - average detection

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8. GROUP INSTALLATION

LIMIT

§15.255 (h) Any transmitter that has received the necessary FCC equipment authorization under the rules of this chapter may be mounted in a group installation for simultaneous operation with one or more other transmitter(s) that have received the necessary FCC equipment authorization, without any additional equipment authorization. However, no transmitter operating under the provisions of this section may be equipped with external phase-locking inputs that permit beam-forming arrays to be realized.

RESULTS

The frequency, amplitude and phase of the transmit signal are set within the EUT. There are no external phase-locking inputs or any other means of combining two or more units together to realize a beam-forming array.

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9. RF EXPOSURE

FCC RULES

§1.1310 The criteria listed in Table 1 shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified in §1.1307(b), except in the case of portable devices which shall be evaluated according to the provisions of §2.1093 of this chapter.

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3–3.0	614	1.63	*(100)	6
3.0–30	1842/f	4.89/f	*(900/f^2)	6
30–300	61.4	0.163	1.0	6
300–1500			f/300	6
1500–100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*(180/f^2)	30

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)—Continued

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)	Averaging time (minutes)
30–300	27.5	0.073	0.2	30
300–1500			f/1500	30
1500–100,000			1.0	30

f = frequency in MHz
* = Plane-wave equivalent power density

NOTE 1 TO TABLE 1: Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.

NOTE 2 TO TABLE 1: General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or can not exercise control over their exposure.

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CALCULATIONS

EIRP is converted to Power Density using the equation:

P_D = EIRP / (4 * Pi * D_S^2)

where:

P_D = power density in W/m^2
EIRP = Equivalent Isotropic Radiated Power in W
D_S = separation distance in m

Power density in units of W/m^2 is converted to units of mW/cm^2 by dividing by 10.

RESULTS

RFEM0

Channel 1

Average EIRP (dBm)	Average EIRP (W)	Separation Distance (cm)	Power Density (mW/cm^2)	FCC Limit (mW/cm^2)
23.5	0.224	20	0.04	1

Channel 2

Average EIRP (dBm)	Average EIRP (W)	Separation Distance (cm)	Power Density (mW/cm^2)	FCC Limit (mW/cm^2)
25.5	0.355	20	0.07	1

Channel 3

Average EIRP (dBm)	Average EIRP (W)	Separation Distance (cm)	Power Density (mW/cm^2)	FCC Limit (mW/cm^2)
24.5	0.282	20	0.06	1

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RFEM1

Channel 1

Average EIRP (dBm)	Average EIRP (W)	Separation Distance (cm)	Power Density (mW/cm^2)	FCC Limit (mW/cm^2)
22.1	0.162	20	0.03	1

Channel 2

Average EIRP (dBm)	Average EIRP (W)	Separation Distance (cm)	Power Density (mW/cm^2)	FCC Limit (mW/cm^2)
24.3	0.269	20	0.05	1

Channel 3

Average EIRP (dBm)	Average EIRP (W)	Separation Distance (cm)	Power Density (mW/cm^2)	FCC Limit (mW/cm^2)
23.9	0.245	20	0.05	1

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